Bridgewater

THE PATH-VVAY To KNOVVLEDGE;

Containing the whole Art of ARITHMETICKE, *both in whole Numbers, and Fractions; with the extraction of Roots; as also a briefe Introduction or entrance into the Art of* Cossicke Numbers, *with many pleasant questions wrought thereby.*

Digested into a plaine and easie methode by way of Dialogue, for the better vnderstanding of the learners thereof.

Wherewith is also adioyned a briefe order for the keeping of Marchants Bookes of Accompts, by way of Debitor *and* Creditor

AT LONDON,
Printed by Thomas Purfoot, *for* Tho: Pauier. *An.* 1621.

TO THE RIGHT WORSHIPFVL Sir *Thomas Smith* Knight, Gouernour of *the Company of Marchants of* London, *Trading the* East-Indies, *and the* Moscouie *company*, as also the Company of Discouerers for the *North-West Passage, and Treasurer for the Plantaion in* VIRGINIA.

IT is growne (Right Worshipfull) almost to a common receiued opinion in these daies, that, what Booke, how triuiall soeuer, shall passe into the view of the world without a Patron, is held abortiue, or like an vntimely birth: In which respect, hauing at the request of a friend, vndertaken the publishing of this worke: directed chiefly by custome, as also for that I wold not be taxed with innouation, I emboldned my selfe to passe the same forth vnder your Worships protection. Induced the rather thereto, by reason, that the subiect thereof beeing Arithmeticke, and one of the liberall Sciences, I thought it could not receiue more kind entertainement, then where the vse and benefit thereof was so well knowne and respected. And beeing the primary or first path gate, or entrance into other the Mathematiques, as also a principall assistant to Nauigation, which is the chiefe and most effectuall branch produced from the naturall sap and nourishment of the former, where should it find a fester harbour to ride in, against the tempestuous stormes of turbulent depravors, or a more pleasing Arbor to contemplate in, free from the schorching beames of enuious detractors (then) where industry is aduanced, idlenes depressed, Arts cherished; & ignorance banished: Euident it is (Right Worshipfull) that industry is seated in your daily cogitations, as is apparant by your continuall care produced from those multiplicities of important businesses; still depending

vpon the diſpoſing of your prouident directions. And that Arts (but moſt eſpecially Nauigation) which is the moſt noble ſtem and profitable branch that euer ſprang from them, is cheriſhed, yea nurſed and continually foſtred by you, the whole world cannot but take notice off by your varieties of Counſels, directions, orders and diſpoſings for the ſeuerall imployments of ſhips, Marriners, and others, not onely for ſetled trades, but alſo for new diſcoueries, to the great benefit of many thouſands imployed therein, a continuall profit to the Common-wealth, and a laſting glory to our Nation. And might I but indifferently ſpeake my mind? without beeing detected of flatterie, which I proteſt I am abſolutely cleere off) how would I renumerate, that moſt worthy and generous intention of yours, for the reading of a lecture of Nauigation. Shewing your great loue thereto, not onely in the free vſe of your houſe, but alſo in the large contribution towards the maintenance thereof from your bounty: O that there were many like benefactors and fauorers of ſuch excellent exerciſes: How would this our Iſland floriſh, (doubtleſſe) as now it is not inferior to any the greateſt Continent, or moſt potent Kingdome, ſo then would it farre ſurpaſſe them all; eſpecially in the trade of Marchandize and Nauigation the two chiefe props and pillars of a well governd and floriſhing Common wealth; but perhaps it may be obiected vnto me thus, what good doth theſe publique readings which hath now beene a reaſonable time continued in this Citty, with great charge to good purpoſe, but little profit as may be gueſſed, by the little Audience which doe commonly frequent them; Surely one way it is the indigence & dulnes of this our age, or at leaſt-wiſe a kind of ſuperbity in many that feare to bee taxed with wants or imperfections in ſome ſuch things whereof they profeſſe themſelues exquiſite. And for the Arts there taught, I meane the Mathematiques, the practiſers thereof are few, in reſpect of thoſe that are practiſers and profeſſors of Nauigation, which are generally all the better ſort of Marriners and Sea-men, (and thoſe practiſers aforeſaid) being for the moſt part either Gentlemen of the Countrey, or ſuch in the Citty, whoſe Law buſines, or other occaſions in the tearme time, hinders them from thoſe excellent exerciſes, which doubtleſſe all of them doe zealouſly loue & applaud. Yet cannot their more ſerious buſines allot ſo much time as to bee preſent according to their deſires. But were there a lecture of Nauigation, a profeſſion which a multitude of people make their onely liuing

liuing by; And to be read in ſuch a place, where they ſhall not only be ſeene, knowne, and noted, (for well ſpending their time) by their owners, ſetters forth, and principall ymployers, but alſo their daily and frequent buſines attracting and neceſſarily drawing them thither, there is no queſtion to be made of a very ſufficient Auditory and great benefit to be reaped thereby. as doubtles much good hath already beene effected by the late readings, in leſſe frequent and eminent places before time: For inſtance whereof, I verely thinke, nay I dare partly ſpeake vpon knowledge that the publike readings of ſome, and extant writings of others of our Learned Mathematicians of late daies hath in this our Land made more capable Marriners fit for moſt navigable imployments within theſe few yeares, then in former times could be found, almoſt in the whole age of a mans life. Thus haue I (Right worſhipfull) digreſſed from my ſelfe in medling with what is nothing pertinent vnto mee, but my hope is, that my ouer-boldnes will be imputed rather to my zeale vnto knowledge, then other wiſe, which might your worſhip be ſo pleaſed to make conſtruction and withall to accept this ſimple labor into your favourable protection, I ſhould with my prayers for the increaſe of ſuch good benefactors and louers of Arts, the proſecution of ſo laudable an exerciſe, and the continuance of your Worſhips health, and proſperitie, reſt,

Humbly devoted at your
Worſhips ſeruice,

IOHN TAP.

To the Reader.

FRiendly Reader, (for ſo I entitle thee) how critically, harſh, or mildly Iudicious, ſoeuer thou doeſt deliuer thy iudgement vpon mee, for well doe I know that I ſhall vndergoe the burthen of many cenſurers ſome like ſnarling Satyres biting without warning, or ouer haſty iudges condemning me without triall, others more ſencibly ciuile, & learnedly wiſe, will in regard of my good will only deplor the weakenes of my wit, in taking vpon me the diuulging of a work, the perfection wherof is ſo far aboue the apprehenſion of my capacity, but my hope is the ſharpeſt cenſure of the modeſt and wiſe, will be only to ſay (in regard of my ſelfe,) that who is bolder then blind bayard, and in reſpect of the worke, doubtleſſe heere was a faire tree but ſpoyld in the hewing, or a goodly garment mard in the making, (well) being begun it muſt be ended, and for the mittigation of my puniſhment for vndertaking ſo great taske being ſo weakely prouided, of the wiſe I will craue pardon, and of others I will ſay that I intended it for their good, and ſo queſtionleſſe ſhall I ſpeake the truth, nothing doubting but how harſh and vnpoliſhed ſoeuer the method thereof bee, yet may many that are yet ignorant, reape much profit in attaining to the knowledge of ſuch things which hitherto they haue been deſtitute off, onely this I am well aſſured, that all the glory which I ſhall get by it (is) that if there bee any thing in it worthy taxation, I am the only obiect for the beames of ſeuerall cenſures to reflect vpon, very loath was I to father it hauing begotten the leaſt part of it, but onely at the earneſt

requeſt

request of my deare friend who procured me to ſpend ſome part of my beſt leaſure in doing that little which I haue done: (as well knowing) that if it ſhould (which is almoſt impoſſible for moſt things) paſſe with a plaudite, then ſhould I wrong him who tooke great paines in doeing ſome part of it, if it be found palpable, then am I onely ſubiect to reproofe. But being very willing as much as in mee lyeth to cleere all ambiguities, and that each party interreſſed heerein, may ad heere to himſelfe that praiſe or detractiō which may fitly be adiudged his (know) that the ground and originall of this worke was the Booke formerly knowne by this title (namely the Path-way to knowledg) which being as I take it, tranſlated out of Dutch, whether by the Tranſlators ouer-ſight, or the Printers negligence I know not, was publiſhed in many places, not only obſcure & difficult for a learners apprehenſion, but alſo ſomewhat confuſed as hauing both Rules and queſtiones of roſſe and vulgar Arithmeticke, mixed diffuſedly one with another without order or method, and the whole impreſſion being diſperſed and gone, my ſaid friend to whome the intereſt of the ſayd Copy did belong, willing to reprint the ſame, and withall very deſirous to haue it peruſed and put into a more plainer and eaſie method, for the vnderſtanding of the weakeſt Capacitie, importuning ſuch as he could heare off to effect the ſame, of which ſome wiſely refuſed to build vpon any foundation other then their owne, onely I though leaſt fitting, as hauing little knowledge & leſſe practiſe, being much preſſed, began the method in the plaineſt manner that poſſible I could, and ſo proſecuted it for the firſt 6 ordinary Rules in whole numbes, when finding my buſines ſuch, that I could not continue it, left it off to another, being a profeſſor of good practiſe in the ſaid Art, who in my iudgement hath with great paines and laborious induſtrie, waded through the

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reſt of the Rules of vulgar Arithmeticke, illuſtrating the ſame with much varietie of exemplary queſtions fitting to all occaſions, depending thereon: And beeing that in the former Booke were ſome directions, and many queſtions reſolued by the extracting the Square and Cubicke rootes, as alſo by the Art of Coſſicke Numbers, I haue vſed my beſt meanes, to make this Booke alſo to entreat of the like Subiect; for the extraction of Roots, I meane for finding the neareſt Root of a number not right Square or Cubicall, I haue obſerued the method vſed in GOSSELIN *vpon* TARTAGLIA, *and for the Rules and queſtions in the Art of Coſſicke Numbers, it is onely a literall tranſlation collected out of* Mr. Valentine Menher *his Arithmeticke. Thus gentle Reader haue I ſayd what I can for my ſelfe, and holding vp my hand to the barre of your beſt Iudgements, deſiring only in my tryall to haue your mildeſt cenſures: I bid you heartily farewell.*

I: T.

THE PATH-WAY TO KNOWLEDGE.

A familiar Dialogue wherein Theodore *teacheth, and very plainely layeth open to* Iunius *his* Scholler, the whole Art of Arithmeticke.

Numeration.

IVnius. M. Theodore, I am very glad that my good happe hath béne so happily to méet you at your house this morning, for I assure you I could not be quiet till I came to you: by reason, that since our last being together, when you wrote so many rare Questions in Arithmeticke, I haue béen so in loue with the Art, that the more I thinke thereof, the more desirous I am to learne it; which, hoping you will doe your best indeauour vpon reasonable considerations to

inſtruct me therin, I purpoſe preſently (if you ſo pleaſe) to be your Scholler.

Theod. Truſt me you are welcome, and I promiſe you I will doe what lyes in mee for your ſatisfaction, though not ſo much for your money as becauſe you are ſo well addicted to ſo excellent a ſtudy: therefore not to trifle away the time we will begin with Numeration, which is the firſt rule you muſt learne.

Inni. What is Numeration?

Theod. Numeration ſheweth the manner how by Figures and Ciphers, to expreſſe the value of any number whatſoever.

Inni. Shew me firſt, what Figures & Ciphers are, and how many ſeverall ſorts there are of them?

Theod. The whole art of Arithmeticke is wrought with Nyne Figures and one Cipher, which are thus marked and knowne, one, 1. tw, 2. thrée, 3. foure, 4. fiue, 5. fire, 6. ſeauen, 7. eight, 8. nine, 9. cipher, 0. where you muſt note that when any of the 9. figures ſtand alone by it ſelfe, it ſignifieth no more but the ſimple value therof, but if another figure or cipher be after it, then is it ten times the value thereof, and if two figures or ciphers be after it, then it is an hundred times ſo much as his owne value: and a principall thing to be remembred is, that in numbring you muſt marke the number of figures contained in the number propoſed, which are called places, which places muſt be counted from the laſt to the firſt, thereby to know what denomination to giue to the firſt figure of the ſaid number, and conſequently of the reſt. For as I ſaid, the laſt figure if there be more than one, is the firſt place of the number, which figure is no more than his ſimple value, and the

next being the ſecond place, is ten times ſo much as the figure (if it were alone) importeth, that in ỳ third place an hundred times the ſimple value, & that in the fourth place a thouſand times ſo much as the figure it ſelfe is.

Iuni. When I perceiue that where there is many figures in one number, each figure in his place is tenne times ſo much as ỳ next towards the right hand, which if it be ſo, the order maketh the worke very plaine.

Theod. You conceiue of it very well, neuertheleſſe for your better ſatisfaction behold this Table, which though it be breefe, yet it is very pithie. For thereby you may number any ſumme whatſoeuer, being that all ſums haue one manner of numbring, which is, that each figure is either ſimple or compound. I call it ſimple when it ſtandeth for no more but his owne value: and compound when it ſtandeth for no more then his owne value, as the figure 3. when it ſtandeth alone, or is the laſt figure and firſt place of any ſumme, is ſimply 3; and when it ſtandeth in the third place which is the place of hundreths, then is it likewiſe three, though not ſimply three, but three hundreth, &c.

Places		Walues.
9	Nynth.	C. of Millions.
8	Eighth.	X. of Millions.
7	Seauenth.	Millions.
6	Sixth.	C. of thouſands.
5	Fifth.	X. of thouſands.
4	Fourth	Thouſands.
3	Third.	Hundreths.
2	Second	Tennes.
1	Firſt.	Vnities.

Iuni. Then by your leaue I will try if I can rightly number all thoſe figures in the former Table. Firſt I ſee them to be Nyne ſeuerall figures or places, which I ſet downe thus 365427836, and becauſe 3. which is

the firſt figure and in the ninth place is in the place of hundreth Millions, therefore is it 3. hundreth millions and the next figure 6. ſixty millions, the next 5. millions, then 4. hundreth thouſand millions.

Theod. Soft, you are ſomewhat too haſty, doe you not ſée that as you haue had thrée places of millions, ſo now is there thrée places of thouſands, and laſtly thrée places of ſeuerall denominations, viz. hundreths, tens, and vnities.

Iuni. It is true I ſée mine errour, and by mine error and your correction of it, I conſider better of it then otherwiſe I ſhould haue done: therefore I thinke the right ſumme of all together is 3. hundreth ſixty fiue millions, 4. hundreth twenty ſeauen thouſand, and 8. hundreth thirty ſix.

Theod. It is very true, and if you marke well how you haue numbred this, by the like order may you number any ſumme whatſoeuer, onely before we proceed to the next rule, let me ſée if you can ſet downe thrée thouſand and forty in figures.

Iuni. I did thinke that I had béene perfect in Numeration, but now I ſée that I am at a nonplus, for where as thouſands muſt ſtand in the fourth place, I haue but two figures to expreſſe them withall, which if I ſet downe thus 34, it makes but thirty foure: therefore I pray you helpe mee forwards for this time, and I will ſée if I can conceiue better hereafter.

Theod. Then you muſt note, that for this purpoſe ſerue ỳ ciphers which before I told you of made thus o, which indéed of themſelues ſerue for nothing but to ſupply the places of euen tens, hundreths, thouſands, &c. for being alone it is of no value, neither doth it ſignifie

any

any thing, but ſtanding after another figure, it giueth a denomination to the ſaid figure, and ſupplieth the place as well as if a figure were there.

Iuni. Now I hope I ſhall doe it according to your inſtruction, and becauſe I muſt haue thouſands and tens, I ſet downe my ſumme thus 3040, expreſſing three thouſand by the figure 3, and hauing no hundreth I put a cipher in the place of hundreths, then for fortie I ſet downe 4. in the ſecond place, and hauing no od vnities, I put in the firſt place belonging thereto another cipher.

Theod. It is very well done, but yet for your further inſtruction becauſe you ſhold not hereafter doubt, behold this ſmall Table expreſſing theſe euen numbers by ciphers.

Tenne,	twenty,	thirty,	fortie,	fiftie,	ſixtie,	ninety,
10.	20.	30.	40.	50.	60.	90.
One hundreth,	one thouſ.	ten thouſ.	three hund.	thouſ.		
100.	1000.	10000.	300000.			

Iuni. This is very plaine, and I vnderſtand it well, therefore I pray you ſhew me the next rule, how it is called, and the order thereof.

Addition.

THeodorus. The next rule to be learned is Addition, the vſe whereof is of diuers ſeuerall and particulars ſummes or numbers, to make thereof one groſſe or totall ſumme, being equall in value to all the ſaid particulars, the manner whereof being very eaſie, is thus. Firſt ſet downe all the ſeuerall ſummes one directly vnder another, the greateſt firſt, and the leaſt loweſt of all: where you muſt remember that if the one ſumme doe not conſiſt of ſo many figures as the other, they muſt be ſet euen one vnder or againſt the other on the right hand in this order, which being ſet downe, draw a line vnderneath, vnder which line muſt be ſet the totall ſumme of all thoſe foure ſeuerall parcels, which totall ſume is thus found:

34296
2543
759
38

beginne at the laſt and loweſt figure on the right hand, and to the ſame adde all the other figures which are directly ouer it, and hauing added them together, marke how many times ten is contained therin, which keepe in your minde, then ſet downe the ouerplus or vnities vnder the line, and vnder thoſe figures which you added together, and for euery ten kept in mind count vnities to the figures in the ſecond place, which adding as before, ſet downe the vnities vnder the line in the ſecond place, and carry the number of tens to the third place, which adding as before, ſet the vnities vnder, the

the line, and carry the number of tens to the fourth place, and when you haue added the figures in the laſt place, ſet the totall ſumme thereof vnder the line with the others, ſo ſhall thoſe figures vnder the line expreſſe the valus of all the parcels aboue the line.

Iuni. I partly vnderſtand you, therefore I pray you onely ouerlooke me, and I will trie my cunning by adding the foure former ſummes together, which I ſet downe ſeuerally each vnder other thus, and beneath I draw a line, then I begin at the laſt figure on the right hand being 8. which I adde to all the other figures ouer it, viz. 9. 3. 6. ſaying 8. and 9 is 17. and 3. is 20, and 6. is 26, which being 2. tens and 6. vnities, I ſet 6. vnder the line, and carrying 2. to the next place, I ſay 2. and 3. is 5, and 5. is 10, and 4. is 14, and 9. is 23, then I put 3. vnder the line, and carry 20. or 2. tens to the third place ſaying, 2. and 7. is 9, and 5. is 14, and 2. is 16, I ſet 6. vnder the line, and carry 1. to the fourth place, ſaying, 1. and 2. is 3. and 4. is 7, which 7. I ſet vnder the line, and being vnder 10. I carry nothing to the fift place, which place hauing but one figure which is 3. I ſet the ſaid 3. vnder the line likewiſe, ſo is the whole ſumme of all the foure particular ſums 37636.

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	38
	37636

Theod. Your conceit is good, and I cannot but commend your diligence, but the better to prompt you in this rule, I will propoſe ſome few queſtions vnto you being that by examples all teaching is made facile and eaſie. Firſt therefore anſwere me to this: A Marchant had owing him by three ſeuerall men as followeth, the firſt oweth him 3456 li. the ſecond 1234 li. and the

third 536 li. the queſtion is how much all their three debts together amount vnto.

Iuni. Firſt, as you gaue me inſtructions I ſet downe the three ſummes one vnder another, the greateſt vppermoſt, and the ſmalleſt lowermoſt, with a line vnderneath them, as I did in the firſt example, then adding 6. 4. and 6. together makes 16, I ſet 6. vnder the line, and carrying 1. to 3. the loweſt figure in the ſecond place, I adde 1. 3. and 5. together, they make 12, I ſet 2. vnder the line, and carrie 1. to the figure 5. being the loweſt in the third place, ſaying, 1. 5. 2. and 4. is 12, I ſet 2. alſo vnder the line, and carry 1. to the other 1. in the fourth place, ſaying, 1. 1. and 3. is 5, which ſetting vnder the line, the whole is 5216, being the whole ſumme of the three ſeuerall debts.

3456
1234
536
5216

Theod. You haue done well, but when you haue made an addition (hauing none by to looke to your worke) can you tell how to proue whether youe haue done right or not?

Iuni. Indeed that were a ſure way, for otherwiſe a young ſcholler may quickly be ouerſhot, but albeit that I cannot proue my worke, yet I hope with your helpe to learne, therfore I pray you ſhew me the manner therof and I will be attentiue.

Theod. Then doe thus, when you haue made your addition as afore, beginne at the firſt figure of the ſeuerall ſummes, and go forward from one to another, adding them together, caſting away all the nines, and when you haue all added them, ſee what remaines beſides the nines, and drawing a ſhort line ſet the ſaid remaine at one end therof, that done, adde as before all

the

the figures in the totall ſumme, and hauing caſt away 9 nines, ſet the ouerplus at the other end of the line, if that both the figures be alike, the worke is right, otherwiſe you muſt worke againe.

Iuni. By your leaue I will make triall of the laſt example. Firſt, the ſummes ſtanding as before, I adde all the figures aboue the line, ſaying, 3. 4. and 5 is 12, from which taking away 9. reſteth 3, that added to 6. is 9, which I likewiſe caſt away, then 1. 2. 3. and 4. is 10, 9. caſt away, leaues 1. which added to 5. 3. and 6. makes 15, from which 9. likewiſe taken, leaues 6, which 6. I ſet at the end of a ſhort line, and adding 5. 2. 2. and 6. the totall ſumme thereof together makes 15, from which 9. taken, leaues likewiſe 6, which I ſet at the other end of the line, & being that both are alike I conclude the worke to be true, therfore if you thinke I haue profited well in this Rule, let me proceed to the nert.

	3456
	1234
	536
	5226

Theod. May ſoft you are ſomewhat too haſty in leaping ouer the hedge before you come at the ſtile, for as you haue learned to adde together, and to make a groſſe ſumme of diuers particulars conſiſting of one certaine denomination, the like muſt you learne to doe when there is ſeuerall ſummes of diuers denominations, as of pounds, ſhillings, and pence in money: of yards, feet, and inches in meaſure: of hundreths, quarters, pounds, and ounces in weights, &c.

Iuni. I pray you ſhew me an example with explanation, and you ſhall ſee how ready I will be to imitate.

Theod. Firſt, as before ſet downe your particular ſummes

ſummes, the ſummes of greateſt value firſt, and the reſt in order accordingly, then beginning at the laſt & leaſt denomination, and adding them together as they ſtand one ouer another, loke how many of the nert denomination is contained therin, which you muſt deduct ſetting downe the ouerplus, and carrying the ſaid deduction to the place bearing the ſame denomination, which being likewiſe added together, marke how many of the nert denomination is therein, which deducting, ſet the remainder vnder the line and carry the deduction to the nert place, as before.

Inni. I pray you make it plaine by an example, for I hardly vnderſtand it.

Theod. Let this be the example. A Marchant hath at ſeuerall times receaued of his debtor theſe parcells of money whereof by addition he would know the totall Sum. Firſt, note that there are three ſeuerall denominations, viz. pounds, ſhillings, and pence, therefore according to order I beginne with the laſt which are pence, ſaying, 10. and 6. is 16, and 4. is 20, and 6. is 26, and 8. is 34, now to ſet downe 34. pence is vnproper, therefore I conſider that in 34. pence is 2. ſhillings 10. pence, which 10. pence I ſet directly vnder the place of pence, & carry 2. ſhillings to the nert place and denomination of ſhillings, ſaying 2. I carried & 2. is 4. and 3. is 7, and 7. is 14, and 3. is 17. I put 7. vnder the line, and carry 10. to the nert place and ſame denomination, ſaying, 10. 10. and 10. is 30. which with the 7. already ſet downe makes 37. ſhillings: but by reaſon that there is pounds likewiſe to be added, it is

li.	s.	d.
345	13	8
232	10	9
54	7	4
25	3	6
20	2	10

improper to set downe 37. shillings, therefore I deduct 1. pound and set downe 17. shillings, which 1. I carry to the next denomination or place of pounds, saying, 1. and 5. (omitting the o) is 6. and 4. is 10. and 2. is 12. and 5. is 17. I set 7. vnder the line, and carry 1. to the next place, saying 1. 2. 5. 3. & 4. is 17. I set 7. vnder likewise, and carrying 1. to the next place I say 1. 2. and 3. is 6. which I set likewise vnder the line, so is the grosse sum of all the particulars in their severall denominations 677. pounds 17. shillings, & 10. pence, the whole worke being as you see here portrayed.

li.	s.	d.
345	13	8
232	10	6
54	7	4
25	3	6
20	2	10
677	17	10

Iuni. If this be the greatest difficulty, I hope to conceiue of it without any great deliberation or tedious studie, therefore if you please to set me another question of the like nature, I will endeauour my selfe to worke it as you haue done this.

Theod. A Noblemans Steward for the behoofe of the houshold hath laid out at certaine times these summes of money, whereof he would know the totall summe.

li.	s.	d.	ob.
134	7	4	ob.
322	10	6	ob.
35	17	8	ob.
23	13	4	
516	8	11	ob.

Iuni. First, I see that the sum consists of foure denominations, viz. pounds, shillings, pence, and halfe pence, next I consider that 2. halfe pence make a penny, 12. pence a shilling, and 20. shillings a pound: then begining to adde at the halfe pence which are 3. I set the odde halfe penny vnder the line, and carry a peny to the next place, saying, 1. and

1. and 4. and 8. is 13, and 6. is 19, and 4. is 23, that is 1. ſhilling and 11. pence, I ſet 11. pence vnder the line, and carry the 1. ſhilling to the place of ſhillings, ſaying, 1. 3. 7. and 7. is 18, I ſet 8. vnder the line, and carry 10. to the next place ſaying, 10. 10. 10. and 10. is 40. which becauſe 40. ſhillings is 2. pound, I carry it to the place of pounds, ſaying, 2. 3. 5. 2. and 4. is 16, I ſet downe 6. and carry 1. to the next place, ſaying, 1. 2. 3. 2. and 3. is 11, I ſet downe 1. and carry 1. to the next place, ſaying, 1. 3. and 1. is 5. which I ſet downe, and then is the totall ſumme of all the particulars 516 pounds, 1. ſhilling, and 11. pence, ob. but now it reſts whether I may proue this as I did the other or not, for it ſeemeth to be more troubleſome to proue becauſe of the ſeuerall denominations.

Theod. You ſay true, neither is it to be proued ſo in all reſpects, albeit the ground is alike by caſting away the nines, for as when we haue but one denomination you draw but one line, ſo in this you muſt draw ſo many lines as you haue denominations in your addition, naming euery line for one certaine denomination, and then caſting away the nines from the numbers of each denomination in the particulars, & ſetting the remainer at the end of the line belonging thereto, & after doing the like by the totall, if the figure ſtanding againſt each other agree together it is well, or elſe not, as in the laſt example.

Iuni. For the foure denominations I draw foure lines, naming the higheſt pounds, the next ſhillings, &c. then for the 3. ob. I take away a penny and ſet the odde ob. at one end of the loweſt line, then adding

3	3
8	8
2	2
ob.	ob.

ding the pence which are 23. I take away the shilling, & casting away 9. from 11. pence, rests 2. pence, which I set at the end of the next line, then adding the shilling with that which I carried from the pence maketh 48. the 40. shillings being 2. pound I take away, and the 8. I set at the next line, and with 2. pound I goe to the last denomination, and adding all the figures severally together, saying, 2. 3. 5 2. and 4. is 16. from which 9. taken, leaues 7, then 7. 2. 3. 2. and 3. is 17. from which 9. taken, leaues 8, then 8. 3. and 1. is 12, 9. taken away 0. leaues 3, which I set at ŷ end of the highest line, then I come to the totall, beginning at the last I set downe an ob. against the first and taking 9. from 11. pence, leaues 2. which I set against the second, then I set 8. against the third, and lastly adding 5. 1. and 6. is 12. from which 9. taken, leaues 3. which I set against the highest, and so are the figures of each line answerable to other, whereby I see the worke to be good.

Theod. You haue rightly vnderstood me, and your proofe is well made, therfore I will only set you downe certaine examples of Additions, wherewith you may practise at your pleasure, and so I will proceed to Substraction the next rule to be learned.

li.	s.	d.
1345	16	8
3241	10	6
2343	09	4
532	07	3
7463	03	9

Proofe
2——2
3——3
0——0

li.	s.	d.	ob.
56459	10	10	ob.
32542	00	8	ob.
5753	15	4	ob.
4376	17	3	ob.
325	07	7	ob.
30	14	6	ob.
99488	06	4	ob.

Proofe
2——2
6——6
4——4
ob.——ob.

Yards.	Feet.	Inches.
545	2	7
232	1	4
325	2	9
46	1	10
1150	2	6

Proofe
7——7
2——2
6——6

Pounds.	Ounces.
345	12
436	07
325	15
34	10
23	06
4273	02

Proofe
7——7
2——2

Iuni. Now I pray you shew me what Substraction is, and the order of working thereof.

Substraction.

Subſtraction.

THeodorus. Subſtraction is the manner how to take the value of one ſumme or figure from another, and to ſet downe or know the value of that which doth remaine be it of one ſumme in particular, or of diuers, the worʒking whereof, is thus. Firſt ſet downe your greater ſumme, and directly vnder it the leſſer which is to be taken therefrom, ſetting them euen at the right hand as in Addition with a line vnderneath, then as in Addition you adde the two laſt figures together, and ſet downe the totall vnder the line, ſo in this you muſt take the loweſt from the vppermoſt, and ſet the remainder vnderneath, as thus, if you would take or ſubſtract 3564. from 8786. I ſet the two ſummes thus, and beginning at the laſt figure in the loweſt rowe which is 4, I take 4. from 6. being directly ouer it, and the remainder 2. I ſet vnder the line, then comming to the nert figure towards the left hand being 6, which take from 8. ouer it, leaues likewiſe 2, which alſo I ſet vnder the line, then 5. from 7. reſteth 2, and laſtly 3. from 8. leaues 5, ſo is the whole remainder 5222 the worʒke ſtanding as is aboue ſhewed.

8786	
3564	
2	
8786	
3564	
5222	

Inuen.

Iuni. We thinkes this is very eaſie, therefore if you will giue me another example I will trie if I can worke it as you haue done this.

Theod. Then tell me if 32465. pounds be paid out of 56879. pounds, what reſts behind to pay.

Iuni. Firſt, I ſet downe the greater ſumme as you taught me, and vnder it the ſumme that is to be taken there from, with a line vnderneath thus, then I begin at the laſt figures and firſt place ſaying, 5. taken from 9. leaues 4. which I ſet vnder the line, proceeding to the next place, I take 6. from 7. and ſet the remainder 1. vnder the ſame line, againe 4. from 8. reſts 4, then 2. from 6. leaues likewiſe 4, and 3. from 5. reſts 2, all which ſet downe in order, the worke is thus, concluding that if 32465. be ſubſtracted or paid out of 56879. pounds there wil reſt vnpaid 24414. pounds.

56879	
32465	
14	
56879	
32465	
24414	

Theod. You haue well done, now tell me if 45638. pounds be taken from 84345. pounds, what reſts.

Iuni. As before, I ſet downe the two ſummes thus, but now I am in a wood, for to take 8. from 5. I cannot, therefore now your helpe would doe well at a pinch of need.

84345	
45638	

Theod. When it ſo fals out that the lower figure is greater than that ouer it, you muſt borrow an vnity from the next figure to it, which in that place will be 10. more, as here being that 8. cannot be taken from 5. borrow 1. of 4, and then take 8. out of 15. and ſet 7. the remaine vnderneath, remembring neuertheleſſe to adde the

the vnitie borrowed to the next figure below, ſaying, 1 that I borrowed and 3, is 4, which taken from 4, the ſecond ſigure above, there reſts 0, which I ſet downe vnder the line, thē becauſe the next figure 6, cannot bee taken from 3. which is ouer it, I borrow 1, to make it 13, & 6 taken from 13 leaues 7, which being ſet vnder the line I pay 1, which I borrowed by adding it to 5, & then I ſay 1 borrowed & 5 is 6, which cannot be had in 4, but being taken from 14, reſts 8, it being ſet vnder the line I reſtore 1. borrowed again, by making 5 of 4, & laſtly taking 5, frō 8, the figure ouer 4, leaues 3, which being likewiſe ſet vnder the line the whole Summe of the remainder is 38707. The proofe of Subſtraction is very eaſie, namely by Addition, for if you adde the ſumme deducted and the remainder together, the totall agréeing with the firſt groſſe ſumme the worke is true, otherwiſe not, as in the laſt example adding 38707. with 45638, it maketh 84345. the firſt groſſe ſumme.

	84345
	45638
	38707

	45638
	38707
	84345

Iuni. Now I make no queſtion but I ſhall be perfect in this by mine owne practiſe, therfore I pray you proceéd to Subſtraction of ſeuerall denominations.

Theod. As you did in Addition of ſeuerall denominations, the ſame order muſt be kept in Subſtractions, beginning at the ſmalleſt denomination at the right hand, and taking the number of the lowéſt denomination from the number of the ſame denomination directly ouer it, proceéding from one denomination to another

towards the left hand, for example, A Marchant had owing vnto him 3456 li. 17 s. 8 d. whereof he hath receiued 534 li. 10 s. 4 d. The queſtion is what remaineth behind due to the ſaid Marchant to receiue.

In. With your leaue I will try my wits by this queſtion, & firſt I ſet down the groſſe ſum owing at the firſt in this order, then vnder it the ſum paid, each denomination of like qualitie vnder other thus, as you taught me I begin at the right hand with the pence, and taking the leſſer 4 d. frō 8 d. ouer it, there will remain 4 d. to be ſet vnder a line, therfore drawing a line with my pen I ſet 4 d. vnder the other;

li.	s.	d.
3456	17	8
534	10	4
922	7	4

and going to the next denominatiō of ſhill. I take 10 s. from 17 s. and ſet the remainer 7 s. vnder the line, then I come to the laſt place in the worke (though the firſt by order) and taking 4 from 6, the remainder 2 I ſet vnder the line, againe 3 from 5. reſts 2, which I ſet alſo vnder the line; & laſtly 5 from 4 I cannot take, therfore I borrow 1 of 3 the next figure, & therewith I make my 4, 14. from which if I take 5, there will reſt 9, which I ſet likewiſe vnder the line, and becauſe I borrowed 1 out of 3, that is but 2, which hauing nothing to take from it, I ſet it alſo below with the other, ſo is the whole remainder of the totall ſum 2922. pounds, 7. ſhilling, and 4. pence, according to my working, and to proue it I add the 2 leſſer ſums together as they now ſtād ſaying, 4 and 4 is 8, which drawing ano-

ther

ther line I ſet directly vnderneath, then for the nert denomination, 7 and 10 is 17. which I ſet vnder it, and comming to the other I ſay firſt 2 and 4 is 6. that I ſet vnder the line, nert 2 and 3 is 5, which I ſet downe alſo vnder the line, then 9 and 5. is 14, I ſet downe 4, and carry 1 to the nert figure 2. and making therewith 3. I ſet it with the reſt, and ſo is the whole worke thus, where I ſée that 534 li. 10 ſ. 4 d. being taken from 3456 li. 17 ſ. 8 d. leanes behind vnpaid 2922 li. 7 ſ. 4 d. and again the Sum deducted from the groſſe ſum, and the remainder added together, makes the former groſſe ſum, al which agréeing ſo, I hope you wil confirme the truth of my worke, and exerciſe me in ſome more Queſtions.

	li.	ſ.	d.
	3456	17	8
	534	10	4
	2922	7	4
	3456	17	8

Theod. Truſt mee I cannot but confirme that you haue done it very orderly, and alſo I muſt néds commend both your quicke conceit and diligence therein, and for your further practiſe I will propoſe a queſtion to bee anſwered both by Addition & Subſtaction together, viz. A marchant had owing to him by foure ſeuerall reckonings theſe parcells of money, whereof hée hath receaued at times, firſt, 356 li. 17 ſ. 8 d. at another time 546 li. 10 ſ. 8 d. at a third time 435 li. 8 ſ. 6 d. at a fourth time 258 li. 6 ſ. 4 d. and at a fift time 68 pounds iuſt. The queſtion is, whether hée hath receaued more or leſſe than his debt, and how much the difference is.

	li.	ſ.	d.
	1532	5	6
	2325	10	4
	156	15	8
	32	9	6

Iuni. Firſt I adde all the parcels which were owing

to him together into one totall ſumme, and I find them to amount to 4047. pounds and 1 ſhilling, then I ſet the parcells which hée hath receaued in the ſame order one vnder another, & adding them likewiſe into one groſſe ſum, the totall of all the ſaid particulars doth amount vnto 1665 pounds, 3 ſhillings and 2 pence, which is leſſe thē the total of his debt by a great deale, and then to know how much he hath ſtill behind to receiue, I ſet downe firſt the totall Summe of his debts which is 4047 pounds, and one ſhilling, & directly vnderneath the totall of his receiuings, and now to take the leſſer from the greater by Subſtraction I am at a nonplus, for I know not how to take 2 pence from nothing, nor 3 ſhilling from 1 ſhilling, becauſe there is no more figures of the ſame denomination to borrow of.

	li.	ſ.	d.
	1532	5	6
	2325	10	4
	156	15	8
	32	9	6
	4047	1	
	356	17	8
	546	10	8
	435	8	6
	258	6	4
	68	0	0
	1665	3	2
	4047	1	0
	1665	3	2

Theod. You may ſée what it is to lacke a good neighbor to borrow a little mony of when you néed, for you haue béen all this while adding pounds, ſhillings, and pence, and yet for all that now you know not where to get 2 pence to ſupply your want, notwithſtanding becauſe you ſhall not diſpaire, I will helpe you at a dead liſt, by ſhewing you an old corner where you may find both ſhillings & pence, and that is thus, borrow out of your

your pounds 1, and ſo is your 7 but 6. that pound being 20 ſhillings ſet in the place of ſhillings, the 1 ſhilling being 12 pence ſet in the place of pence, and then will your ſummes ſtand thus.

	li.	ſ.	d.
	4046	20	12
	1665	3	2

Iuni. God Lord what a weake capacity haue I, for now me thinks it is very eaſie, and before I could by no meanes conceiue how it ſhould be done, now therefore I take 2 pence from 12 pence ouer it, and ſet then the remainder 10 vnder it beneath the line, then 3. ſhillings from 20. ſhil. leaues 17. ſhillings, which I ſet vnder the line, then comming to the pounds, 5 from 6 reſteth 1, and 6 frm 4 cannot be, but from 14 leaues 8, which being ſet vnder the line, I adde 1 that I borrowed to the next 6 is 7. that cannot be taken from 0, but from 10 reſteth 3 which I ſet downe, and carrying 1 borrowed to 1 in the next place is 2, which taken from 4 ouer it, leaueth 2, ſo is the whole remainder 2381 pounds, 17 ſhillings 10. pence, and ſo much hath hee yet to receiue of his whole ſumme. Now to proue whether it bée well or not, I adde 1665. pound 3. ſhillings 2 d. the number deducted, and 2381. pounds, 17 ſhil. 10 d. the remainder together, and it produceth the firſt totall 4047 li. 1 ſ. 0 d. which ſheweth the worke to be true.

	li.	ſ.	d.
	1665	3	2
	2381	17	10
	4047	1	0

Theod. I will propoſe one queſtion more, which if you anſwere mee directly, we will paſſe from hence to

Multiplication. A Carpenter had bought three ſeuerall boards, the contẽts of which in meſure were thus, one was 14. fwt 9 inches, another was 21. fwte 10 inches, and the third was 24. fwte 11 inches, two of them hee brought home, and the third he left there: Now when he came to demaund the other, hee had forgot the contents thereof, but well he remembred that both of them which he had away came to 36. fwte 7 inches, the queſtion is which of his three boards he left behind.

Iuni. Firſt, I ſet downe the contents of the three boards ſeuerally one vnder another, and by Addition I adde the ſayd particulars into one totall, and the ſumme of them all together is 61. fwt and 6. inches, then by Subſtraction I deduct the 36. fwte 7. inches, which hee had receiued from the totall 61. fwte 6 inches, ſetting one vnder the other thus; now being that I cannot take 7. inches from 6. inches, I take the 1. fwte which is 12. inches, with which the 6. inches makes 18. inches, ſo inſtead of 61. fwte. 6. inches, I ſet downe 60. fwte 18. inches, and the number to be deducted vnderneth, and taking 7. from 18. reſteth 11. inches, which I ſet vnder the line, then 6. from 0. cannot be, but from 10. leaues 4, then 1. borrowed and 3, is 4. which taken from 6. leaues 2, which ſet in order the remainder is 24. fwte 11. inches, which muſt be the contents of the board that hee left

	fœte.	inches.
	14	9
	21	10
	24	11
	61	6
	61	6
	36	7
	60	18
	36	7
	24	11

left behind to receiue, and thus I hope your queſtion is truely anſwered.

Multiplication.

Theod. YOu haue done well, and now (as I promiſed) I will ſhew you the order and working of Multiplication. The effect of which rule is to alter the denomination of any ſumme, retaining ſtill the quantity thereof, as to bring Pounds into Shillings, or Shillings into Pence, Yardes into fæte, fæte into inches, yeares into moneths, Moneths into daies, and daies into houres, &c. and generally any ſumme of a great denomination into a leſſer denomination and greater quantity: but before you can worke any thing by this rule to any purpoſe, you muſt learne by memory this Table here ſet downe, which ſheweth what any two figures being vnities multiplied together doe amount vnto, which Table with the manner of working thereby followeth on the other ſide.

1	2	3	4	5	6	7	8	9
2	4	6	8	10	12	14	16	18
3	6	9	12	15	18	21	24	27
4	8	12	16	20	24	28	32	36
5	10	15	20	25	30	35	40	45
6	12	18	24	30	36	42	48	54
7	14	21	28	35	42	49	56	63
8	16	24	32	40	48	56	64	72
9	18	27	36	45	54	63	72	81

the order of it is thus, to know the product of two figures looke for the one figure in the head of the Table, and the other on the left side therof, and directing your eie frō that in the head downward in the square therof, till you come right against the other figure in the side, that number which is in the common angle when both the squares met is the product of the two proposed figures, as for example, to know how much 7 times 8 is, looke for 7 in the head of the Table, and comming downeward in that square till your eye is right against 8 on the left side, you shall haue in the common angle to them both 56, which is the product of the said 2 figures multiplied together, and so for any other vnities this table sheweth the product, but if your number consist of more figures then one, then you must set downe first the greatest number which is called the multiplicand, and vnder it at the right hand the number which is to bee multiplied by, which is called the multiplier. As if you would know how much 3 times 56 is, first I set downe 56 as you see here, & vnder it 3 with a line below, then must you multiply 3 by each of the other figures aboue it, setting down

56
3

the

the ouerplus of the tens vnder the line, and as many tens as there is in each product, so many vnities must be carried to the next place as thus, the figures being set in order as you see, I say 3 times 6 is 18, I set 8 vnder the line, and for 10 I carry one vnitie in mind to adde to the product of the next place, then I say againe 3 times 5 is 15 and 1 in mind is 16, which because there is no more figures to multiply by, I set downe all the 16 without carrying any thing in mind, so is the whole product, viz. 3 times 56 or 56 multiplied by 3 is 168, & this is all the order of worke when you multiply by one figure onely. For to try how you vnderstand me, let me see if you can tell how much 3 times 168 is, wherenote that the figure 1 doth neither multiply nor diuide, but retaines his own value in Multiplication and diuision, only in Addition and Subtraction it doth both increase and diminish.

56
3
168

Iuni. I thinke that I conceiue of it, and to worke according to your direction, first I set downe 168, and vnder the last figure which is 8 I set down 3, by which 168 must be multiplied with a short line beneath, then I say 3 times 8 is 24, I set downe 4 the ouerplus of the tens vnder the line, and for 20 being 2 tens, I carry 2 in mind to adde to the next place, then I say 3 times 6 is 18 & 2 in mind is 20, which because there is no ouerplus but euen 2 tens, I set downe nothing, but carry 2 in mind to the next place.

168
3
4

Theod. Soft, you make somewhat too much hast, know this briefly that in all the rules of Arithmetique there must be no place in any summe left voyde, but if there

there be no figure apart, then muſt the place be ſupplied with a cipher, for albeit ỳ in common matters nothing is conceaued by imagination, yet in Arithmeticke it may be expreſſed with a cipher, as I ſaid before thus 0.

In. I conceiue mine error, therfore again I ſet downe firſt the multiplicand 168. and vnder it the multiplyer 3, and vnder both a line, then as before I ſay 3 times 8 is 24, the 4 I ſet vnder the line, and for 20 I keepe 2 in mind, then 3 temes 6 is 18 which with 2 in mind is 20, I ſet therfore 0 vnder the line and carry 2, laſtly I ſay 3 times 1 is 3 and 2 in mind is 5, which put downe, alſo vnder the line I ſee that the product is 168 multiplied by 3 is 504 as the worke ſheweth: & to try my ſkill, I will propoſe another queſtiõ, viz. what 5436 multiplied by 4 will amount to, as before I ſet downe the multiplicand 5436, and vnder it the multiplyer 4, and vnder both a line, then I ſay 4 times 6 is 24, the 4 I ſet vnder the line, and for 20 I carry 2 in mind, then 4 times 3 is 12 and 2 in mind is 14, I put 4 againe vnder the line, and for 10 I carry 1, then 4 times 4 is 16 which with the 1 in mind is 17, I ſet downe 7 and carry 1 againe in mind to the next place, laſtly 4 times 5 is 20 and 1 in mind is 21, which becauſe I haue no whither to carry any more I ſet downe 21 with the reſt, and ſo the whole product of 5436 multiplied by 4 is 21744, ſo that now I think I can do any ſumme when the multiplier is but of one figure, but to multiply by more than one I am as farre to ſeeke as at the firſt.

	168
	3
	504
	5436
	4
	44
	5436
	4
	21744

Theod.

Theod. Seeing you conceaue ſo well of this, I doubt not but you will conceaue as well of the reſt which is thus, when you haue any number to bee multiplied by more figures than one, ſet downe your two numbers as before, the greateſt uppermoſt for the multiplicand, and the other vnder for the multiplier, ſetting the figures euen one againſt another at the right hand, and vnder them a line for to ſet the product of the multiplication vnder, then beginne at the laſt figurr of the multiplyer, and multiply it by the figure directly ouer it, and conſequently by all the figures of the multiplicand, ſetting downe the product vnder the line as you did in your other examples, then come to the nert figure of the multiplyer towards your left hand, and multiplying it by the laſt figure of the multiplicand, ſet down the product vnder the ſecond figure of the other product counting from the right hand to the left, which ſo ſet downe by the ſaid ſecond figure of the multiplier, multiply all the reſt of the figures of the multiplicand, ſetting down the products therof directly vnder the other product, which muſt be done ſo by each figure of the multiplier, ſetting the products each vnder other, and euery one ſhorter on the right hand thē the nert aboue it by one figure: laſtly, draw a line vnder them all and adding the products together, ſet the totall ſumme therof vnder the ſaid line for the product of ẏ whole multiplication. As for your better inſtruction I will multiply 32564, by 23. firſt I ſet downe the multiplicand, viz.

32564, and vnder it the multiplyer 23 with a line vnder them both, then I ſay 3 times 4 is 12, I ſet 2 vnder the line and carry 1, then 3 times 6 is 18

32564	
23	
97692	

is 18 and 1 is 19, I ſet 9 vnder the line and carry 1, againe 3 times 5 is 15 and 1 is 16, I ſet downe 6 and carry 1, then 3 times 2 is 6 and 1 carried is 7, which being vnder 10 I ſet down, carrying nothing: Laſtly, 3 times 3 is 9 which I ſet downe alſo: ſo haue I done with the firſt place of my multiplier which is 3, and for the next which is 2 I doe ſo likewiſe, ſaying, 2 times 4 is 8, the ſaid 8 I ſet vnder the ſecond place of the other product which is 9, and I ſay againe 2 times 6 is 12, I ſet 2 next the ſaid 8 towards the left hand and carry 1, then 2 times 5 is 10 and 1 is 11, I ſet downe 1 and carry 1, againe 2 times 2 is 4 and 1 is 5: laſtly, 2 times 3 is 6 which ſet down in order as you ſée, I adde the product of ỹ ſaid two figures multiplied by the higheſt number together, and the totall ſum is 748972, which is the whole product of 32564 being multiplied by 23, and now let me ſée if you can tell mée the product of 3567 multiplied by 254.

32564
23
97692
65128
748972

Iuni. Firſt, I ſet downe the greateſt number, and next the leſſer with a line vnderneath according to your example, then I multiply the multiplicand by the laſt figure of the multiplier which is 4, and the product thereof is 14268, then I multiply the ſaid multiplicand by the next figure of the multiplier which is 5, ſetting the figures of the product therof vnder the other but ſhorter then the other on the right hand by one figure, and the product of the multiplicand by ỹ ſaid 5 is 17835, which done in order is as you ſée here following: laſtly, I multiply the whole multiplicand

3567
254
14268

multiplicand by the laſt place of the multiplier which is 2, and the product thereof I ſet vnder the other two products one figure more towards the left hand, the the loweſt of the other 2, and the ſaid laſt product is 7134, all the three products ſtanding in order as you ſée here: then to know the totall Summe of the ſaid three products, I draw a line vnder them, and by addition I put them all together into a groſſe ſumme which amounteth to 906018; ſo I hope that I am reaſonable skilfull in the rule, albeit that as yet I am altogether ignorant to what end all this ſerueth.

	3567
	254
	14268
	17835
	7134
	906018

Theod. That ſhall be ſhewed after you haue learned to diuide when wée come to Reduction, which although ſome account to be the firſt Rule of Arithmeticke, yet is it no Rule but onely the effect and principall vſes of Multiplication and Diuiſion: in the meane time ſée if you can multiply 340020 by 3400, where you muſt note that when you haue any Ciphers in your numbers after all the other figures, you may multiply the other figures in ſuch order as you did before, omitting the laſt Ciphers, and to the totall product adde ſo many ciphers as are in both your numbers.

Iuni. I thinke I vnderſtand you, therfore I ſet down the two numbers propoſed, and I ſée that in the firſt Summe is one Cipher after the othe figures, beſides the two ciphers in the middle of the number which I meddle not withall, alſo in the multiplier are 2 ciphers after

after the figures, therefore I cut off the ſayd three Ciphers, and then worke with the other figures and Ciphers as before, and the working of them will be thus, being the product of the two figures the remainer of the multiplyer, which added and ſet vnder the line with the three Ciphers which before I cut off, ỹ totall product is 1156068000, and ſo I hope your Queſtion is anſwered.

```
34002 | 0
   34 | 00
------------
136008
102006
------------
1156068000
```

The. You ſay well, now once againe giue me the product of 25000 multiplied by 400, and from thence we will proceed to diuiſion.

Tomi. I ſee firſt that in the 2 numbers there is 5 Ciphers after all the other figures, which I cut off, and then multiplying 25 by 4 the product is 100, vnto which adioyning the 5 ciphers that I cut off from the other two numbers, the whole product wil be 10000000, & now before we go any further I pray you teach me how to proue my worke when I am by my ſelfe without a helper.

```
25   000
 4    00
------------
100000000
```

Theod. The proofe of Multiplication is thus, firſt adde all the figures in the Multiplicand each in their ſimple value together, and caſting away the Nynes, retaine the ouerplus in memory, then doe ſo likewiſe with the figures of the multiplyer, and multiplying the 2 figures together, take away all the Nynes alſo from the product thereof, the ouerplus ſet at the end of a ſhort line: laſtly, adde all the figures of the totall product in their ſimple value, and caſting away the nynes there-

from

from, ſet the ouerplus at the other end of the ſhort line, now if the figures at each end of the line bee alike, the worke is true, elſe not.

Iuni. What will I try in this example, I multiplie 3458 by 32, which ſet downe and wrought as you ſee here, the totall product is 110656, now to proue it I adde 3.4.5.8. the figures of the multiplicand together, the ſum is 20, frō which twiſe 9 taken leaues 2, then 3, and 2, the figures of the multiplyer is 5, which being vnder 9 I multiply by 2, ſaying, 2 times 5 is 10, 9 taken from it leaues 1, which I ſet at y end of a ſhort line as you ſee: lastly, I add all the figures of the totall ſumme, ſaying, 1. 1. 6. 5. and 6. is 19, from which taking away twiſe 9, there will reſt 1 alſo, which I ſet at the other end of the line, ſo I ſee my worke to be true if this be all.

3458	
32	
6916	
10374	
110656	
1	1

Theod. Yea this is all, onely it may be proued another way, namely by Diuiſion, but this is ſufficiēt, albeit when you can readily diuide, you may vſe which way you think beſt: and now we will proceede to the next rule which is Diuiſion, which in each reſpect is contrary to Multiplication, as Subſtraction is to Addition, namely, like as by Multiplication a ſumme is brought from any number to a greater quantity & leſſer denomination, ſo by Diuiſion the ſame ſumme may be reduced to the former quantity and denomination, the working whereof is thus.

Diuiſion.

Diuiſion.

IN Diuiſion there are three things to be remembred, viz. the dividend, the diuiſor, and the quotient. The dividend is the ſumme which is to bee diuided, the diuiſor is the number which the ſaid ſumme is to be diuided by, and the quotient is a crooked line, behind which is ſet downe the figures drawn out of the two numbers, which is called the quotient: the order for working whereof is thus, ſet downe firſt the number to bee diuided, and vnder the ſame at the left hand the figure or figures that it is to be diuided by, but with this prouiſo, that the figures aboue directly ouer the diuiſor be as much or more then the diuiſor, for if the diuiſor be of greater value then the figures ouer it, then muſt you remoue the diuiſor one figure more forward toward the right hand, and at the right hand of the ſaid two numbers draw a crooked line thus ⌐ or in ſome ſuch like forme for a quotient, then if your diuiſor conſiſt but of one figure, ſeeke how oft is contained in the figure directly ouer it, which number put in your quotient, & cancelling the ſaid firſt figure of your dividend, ſet the remainer (if there be any) ouer it, and then remoue the diuiſor vnder the next figure of the dividend,

and

and ſeeke how often it may be had in the number ouer it, with the other figures towards the left hand if there be any, which how often it may be found muſt bee expreſſed with a figure importing the quantitie of times, and ſet in the quotient with the other, and ſo muſt you doe as often as you haue any figure in the diuidend, to remoue the diuiſor vnder, and for euery time that you remoue the diuiſor forward, one figure muſt bee put into the quotient, and no more (how many Figures ſoeuer the diuiſor doth conſiſt of) all which being done, the figures thus found and ſet in the quotient, doth expreſſe how often the diuiſor is contained in the diuidend. But if you diuide by more figures then one, it is ſomewhat more difficult, by reaſon that you muſt take the firſt figure of the diuiſor no oftner then that the ſaid quotient figure multiplied by all the other figures of the diuiſor, may bee taken ſeuerally from the figures directly ouer them, or to the left hand of them.

Iuni. I pray you before you proceede any further explaine the firſt by ſome example, for the eaſieſt as yet ſeemeth very hard vnto me, but I hope by your good direction to ouercome the hardeſt rule of all.

Theod. You ſay true, therefore marke the working of this example, where a Summe is to bee diuided by one figure alone, I propoſe my queſtion thus. How often is 4 contained in 8756, where note that 8756. is the diuidend, and 4. is the diuiſor, therefore I ſet them one vnder the other with a line after them both for a quotient, and the whole will ſtand thus, then I ſeeke how often 4.

8756 |
4 |

the diuiſor may bee taken out of 8 the figure ouer it, which may bee twiſe done and nothing remaineth, therefore I put 2 in the quotient, cancell the figure 8 by giuing a dash with my pen through it, and alſo the diuiſor 4, ſetting the ſaid diuiſor 4 vnder the next figure towards the right hand which is 7, and then will the worke be thus: againe, I ſeeke

8756 |2
44

how often 4 may bee found in 7, which is once and 3 will be ouer, therefore I put 1 in the quotient, and cancelling 7 and 4, I ſet the ouerplus 3 directly ouer 7, and remoue my diuiſor 4 vnder the next figure of the diuidend, and it will be thus: a-

3
8756 |21
444

gaine I ſay, how often is 4 contained in 35, for ouer 4 is 5 and to the left hand thereof ouer 7 is 3, which both together according to their order of place is 35, I ſee that 8 times 4 being 32 may bee taken from 35, and there will reſt 3, ſo I put 8 in the quotient, and cancelling 3 and 5 with the diuiſor 4, I ſet the remainer 3 ouer 5, and remoue the diuiſor vnder the laſt figure of the diuided which is 6, and the

33
8756 |218
4444

worke is thus: laſtly, I ſeeke how often 4 may be taken out of 36, which may be done 9 times, for 9 times 4 is 36, which taken from 36, the two figures ouer the diuiſor leaues nothing, therefore I put 9 in the quotient, and cancell all the other figures both of di-

33
8756 |2189
4444

uidend and diuiſor, ſo is the worke done, whereby I con-

clude

clude that 4 is contained 2189 times in 8756, the worke being as was ſhewed you in the laſt page.

Iuni. Now I partly conceaue of it, therefore I pray you giue me another example, and I will do my indeauour to imitate you in this laſt example.

Theod. Tell me then how often is 5 contained in 35654.

Iuni. According to your direction I ſet downe firſt the dividend which is 35654, & vnder it the diuiſor 5, with a line for the quotient number to ſtand in, at the right hand thereof in this order.

Theod. Nay, there you digreſſe ſomwhat from my direction, for if you remember your ſelfe, I ſaid that if the diuiſor were greater then the figures directly ouer it, then muſt you ſet your diuiſor one figure more forward, as in this example, being that 5 the diuiſor is greater then 3 the firſt figure of the dividend, therefore 5 muſt be ſet vnder the next figure of the dividend which is 5, and ſo haue you 35 to ſéeke how often 5 is contained in, for otherwiſe you muſt haue ſet a cipher for the firſt figure of your quotient, which being the firſt figure of any ſumme ſtandeth for nothing.

35654	|_____
5	

Iuni. I had forgotten that, but now I perceiue the reaſon thereof more plainely, therefore once againe I ſet my figures in order thus, whereby I ſée that 5 the diuiſor may be found in 35 the figures ouer it 7 times, & there will reſt nothing, therefore as you taught me I put 7 in the quotient, and cancelling 35 & alſo 5 the diuiſor.

35654	|_____
5	

I remoue the ſaid diuiſor forwarder vnder the next figure which is 6, and then the worke is thus; then 5 out of 6 can be taken but once and 1 remaineth, therefore I put 1 in the quotient, cancell 6 and the diuiſor, and ouer 6 ſet the remainer 1, and remouing the diuiſor 5 vnder the next figure which is 5 alſo, which with 1 ouer 6 is 15, out of which 3 times 5 may be taken and nothing reſts, therefore I ſet 3 in the quotient and cancell 15 and the diuiſor: againe, I remoue the diuiſor vnder the laſt figure of the diuidend which is 4, out of which I can haue neuer a 5, therefore I am as farre to ſeeke for my laſt figure as I was for the firſt.

3 5 6 5 4	7
5 5	
1	
3 5 6 5 4	71
5 5 5	
1	
3 5 6 5 4	713
5 5 5	

Theod. When it ſo falls out, ſet a cipher in the quotient and cancell the diuiſor onely, letting the figure ouer it ſtand for remainer, for although that a cipher at the beginning of any ſumme ſtands for nothing, yet among or after other figures they ſerue to fill vp places of euen tens, hundreths, thouſands, &c.

Iu. See how chittle witted I am, for I lerned as much in multiplication, but that I had forgotten it till now, by this I remember it, therefore I proceed, ſaying, 5 out of 4 cannot be taken, therefore I put a 0 in the quotient and cancell 5 the diuiſor, and there reſts 4. the worke being thus, but what to doe with the 4 that re-

1	
3 5 6 5 4	7130
5 5 5 5	

maines,

maines, or what it ſtands for, I am ignorant of.

Theod. That 4, and ſo likewiſe of any other ſome, thoſe figures which remaine after the Diuiſion, ſeparate them from the other figures which are cancelled, with a crooked line thus | 4, but for the nature and vſe thereof I will ſhew you when we come to treate of fractions and broken numbers, for till you know what belong to fractions, I cannot explaine vnto you the remainer vpon a diuiſion in ſuch order as is requiſite; now it reſts to ſhew you how to diuide by more figures then one, for which an example will inſtruct you better then many words, therefore marke this, to diuide 4364 by 24, I ſet downe my two numbers with a quotient as before where you ſee that 2. the firſt figure of the diuiſor may be had twiſe in 4 the figure ouer it, but if you remember I ſaid before that you muſt take it no oftner then that the figure which is put in the quotient, being multiplyed by the nert figure of the diuiſor, may bee likewiſe taken from the other figures ouer it, and ſo alſo all the reſt of the figures of the diuiſor being multiplyed by the laſt figure in the quotient, and becauſe that though I may haue 2 times 2 in 4 yet I cannot haue 2 times 4 in 3, therefore I take it but once ſaying, once 2 out of 4 reſts 2, I put 1 in the quotient, cancell 2, the firſt figure of the diuiſor, and 4 the figure ouer it, and directly ouer them both I ſet 2 the remainer, then I multiply the figure 1 in the quotient by 4 the ſecond figure of the diuiſor, ſaying,

4364 | ____
24

2
4364 | 1
24

ing, once 4 is 4, which taken out of 23 the figures ouer it, leaues 19, wherefore I cancell 4 and 23, and ouer 23, I ſet the remainer 19, and then the worke wilbe in this order. Then I remoue the whole diuiſor one figure forwarder, ſetting 2 vnder 4, and 4 vnder 6, whereby I ſée that ouer 2 the firſt figure of the diuiſor the figures vncancelled is 19, and ouer 4 the ſecond figure of the Diuiſor is 6, then I ſéeke how often 2 may bée found in 19, which may bée 9 times, and 1 will bée ouer, but then I cannot haue 9 times 4 out of 16, therefore I take but 8, which I ſet in the quotient, ſaeing, 8 times 2 is 16, that taken from 19, leaues 3, which I ſet ouer 9, cancelling 19 aboue, and 2 the firſt figure of the diuiſor below: againe, I multiply 8 the laſt figure in the quotient, by 4 the ſecond figure of the Diuiſor, ſaying, 8 times 4 is 32, which taken from 36 the figures ouer 4, leaues 4, which I ſet ouer 6, cancelling 36 and the diuiſor, and remouing the diuiſor forwarder, ſo that the laſt figure of the diuiſor is directly vnder ỹ laſt figure of the diuidend, thus: Laſtly, I ſéeke how often 2

1	
29	
4364	1
24	
1	
29	
4364	1
244	
2	
x3	
29	
4364	18
244	
2	
x3	
294	
4364	18
2444	
22	

the

the firſt figure of the diuiſor may be had in 4, which I can take but once, therefore I put 1 in the quotient, ſaying once 2 is 2, out of 4 reſts 2, ſo I cancell 2 the diuiſor and 4 ouer it, and directly ouer them both I ſet the remainer 2; then againe, once 4 is 4, out of 4 ouer it leaues nothing, therefore I cancell all the diuiſor and 4 the laſt figure of the diuidend, ſetting ouer it a cipher, which with the 2 ouer the other figure of the diuiſor makes 20, that I ſeparate from the reſt of the figures that are cancelled, thus, where you may ſee that the worke being finiſhed, there is in the quotient 181, and ſo often is 24 contained in 4364 with 20 ouer, and this order is to be obſerued in all diuiſions whatſoeuer, neuertheleſſe, to make you perfect therein, I will ſet an example for you to worke your ſelfe, which is thus, how often is 352 contained in 56475.

352	56475 | 181
2040	
4364	
24	

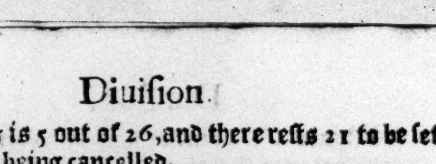
Iuni. As you taught mee, I ſet downe firſt the diuidend or the number to be diuided, which is 56475, and vnder it the diuiſor 352, with a quotient thus, then I ſee that I can take 3 but once out of 5 and 2 will remaine, therefore I put 1 in the quotient, cancell 3 the firſt figure of the diuiſor, and 5 ouer it, and ouer them both I ſet 2 the remainer, then I multiply 1 the figure in the quotient by 5 the ſecond figure of the diuiſor,

352	56475 | 1
2	

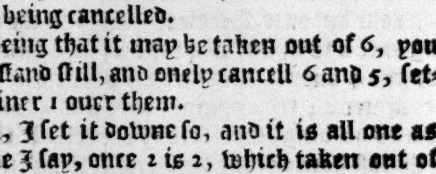
ſaying, once 5 is 5 out of 26, and there reſts 21 to be ſet ouer 26, they being cancelled.

Theod. Being that it may be taken out of 6, you may let the 2 ſtand ſtill, and onely cancell 6 and 5, ſetting the remainer 1 ouer them.

Iuni. Well, I ſet it downe ſo, and it is all one as before: againe I ſay, once 2 is 2, which taken out of 4 ouer it leaues 2, which I ſet downe ouer the ſaid 4, cancelling it and the 2 vnder it, ſo are all the figures of the diuiſor done, and onely one figure in the quotient, therefore I remoue my diuiſor againe forwarder, and then ouer 3 is 21, in which it may be found 7 times, and nothing will remaine; but



becauſe that I cannot take 7 times 5 out of 4, therefore I take but 6, ſaying, 6 times 3 is 18, out of 21 leaues 3, ſo I put 6 in the quotient, and cancell 3 the firſt figure of the deuiſor, and 21 the figures ouer it: againe 6 times 5 is 30, which taken from 32 leaues 2, and 6 times 2 is 12, which alſo taken from 27 leaues 15; it being ſet down, and the other figures cancelled, I remoue my deuiſor againe, and then there will be ouer the firſt figure thereof but 1, out of which 3 cannot be taken, therefore I put a cipher in the quotient, and cancell all the diuiſor,



letting

letting the figures ouer ſtand, and becauſe I can remoue no further, I ſeparate the ſaid remainer from the other figures which are cancelled, wherby I ſée that 352 is contained 160 times in 56475, and there is 155 ouer for the remainer, which if it be right (as I hope it is) I make no queſtion but with eaſe to attaine to the whole art of Arithmeticke, for me thought at the firſt that this Rule had béene very hard as indéed it was) but now the caſe is altred, for I ſée that by diligence & practiſe hard things and difficult are not onely learned, but alſo made plaine & eaſie.

Theod. You ſay very true, for as to dull and vncapable ſpirits all things of any conſequence ſéeme obſcure, difficult, and as it were vnpoſſible to be attaind, ſo to the ingenious & diligent, the hardeſt things euen lay themſelues open, as eaſie, and of no moment to bée comprehended; neuertheleſſe, albeit that you are of a quicke capacity to conceiue, yet I would not haue you to runne lightly ouer that which you learned, for it is commonly ſéene, that thoſe things which are eaſieſt gotten are ſoneſt loſt: but if you meane to haue it ſetled in your memory (as in a ſure Cloſet) then muſt you ply it thoroughly, and leaue not practiſing of it till you haue it as ready at your fingers ends, as if you had béene brought vp to it from your Infancy; and becauſe you may the better after practiſe your ſelfe alone, I wil propoſe one example more vnto you, and from thence wée will goe to Reduction, which ſheweth the vſe both of Multiplication and Diuiſion: the Queſtion is thus, tell mée how often 39104 is contained in 234090164.

Iuni. Firſt I ſet downe the ſeuerall numbers each vnder

vnder other, with a quotient behind after them, which becauſe that 3 the firſt figure of the diuiſor is greater then 2 the firſt of the dividend, I ſet my diuiſor forwarder toward the right hand, and then I ſeeke how often 3 is in 23, which is 7 times, but then 7 times 9 will not be had in 24, therefore I take but 6 times 3 which is 18 out of 23, reſts 5, ſo I ſet 6 in the quotient, cancell 3 and 23, and ouer them I ſet the remainer 5, then I multiply 6 the figure in the quotient by 9 the next figure of the diuiſor, ſaying, 6 times 9 is 54, which taken from 54, leaues nothing, but then I cannot take 6 times 1 out of 0, which is ouer the third figure of the dividend, therefore I ſet my quotient new againe, and put but 5 times 3 therein, ſaying, 5 times 3 is 15, out of 23 leaues 8, ſo I put 5 in the quotient, cancell 3 and 23, and ouer them ſet the remainer 8, then 5 times 9 is 45, from 84 reſts 39, which being ſet ouer I cancell the reſt which is 9 the ſecond figure of the diuiſor, and 84 directly ouer the ſame, ſo will the worke bee thus: againe, 5 times 1 is 5, from 0 cannot be, therefore I borrow 1 out of 9 to make it 10, ſo will there reſt 5 ouer 0, and 8 ouer 9, the

2 3 4 0 9 0 1 6 4 | 6
3 9 1 0 4

5

2 3 4 0 9 0 1 6 4 | 5
3 9 1 0 4

8

2 3 4 0 9 0 1 6 4 | 5
3 9 1 0 4

3

8 9

2 3 4 0 9 0 1 6 4 | 5
3 9 1 0 4

the woꝛke being thus:

	38
	8957
23408901641	5
	39X84

againe, I multiply the quotient 5 by the nert figure of the diuiſoꝛ, which being but a Cipher doth amount to nothing to be deducted from the figures remaining ouer, therefoꝛe I cancell 0, and multiply the quotient 5 by 4 the laſt figure of the diuiſoꝛ, ſaying, 5 times 4 is 20, which taken as beſoꝛe from 90, the figures nereſt ouer 4, leaues 70 to be ſet ouer the ſame, they being cancelled, and then the whole woꝛke will bee in this oꝛder, then I remoue the diuiſoꝛ foꝛwarder by one figure towards the right hand, ſo haue I directly ouer 3 the firſt figure of the diuiſoꝛ 38 vncancelled, out of which 3 may be taken 12 times which is 36, and there will reſt 2, but then I cannot haue 12 times 9 out of 25.

	38
	8957
23408901641	5
	39X84
	3910

Theod. You ſay well, foꝛ indeed you cannot take aboue 9 times how great ſoeuer the ſumme ouer it is, foꝛ this is pꝛincipally to be noted, that you muſt neuer put aboue one figure in the quotient at euery remoue of your diuiſoꝛ, and you cannot expꝛeſſe any ſumme aboue 9 with one figure.

Iuni. I am very glad that I did ouerſée it ſo now in your pꝛeſence, foꝛ otherwiſe I might haue ouerſéene my ſelfe héereafter, when I could not haue knowne how to haue remedied it, therefoꝛe I take but 9 times

3 which is 27 out of 38,
the figures ouer it being
vncancelled, and there
will reſt 11, ſo I ſet 9 in
the quotient, and cancel-
ling 3 and 38, I ſet the
remainer 11 ouer 38,
thus: then I multiply 9
the figure laſt put in the quotient, by 9 the ſecond figure of the diuiſor, ſaying, 9 times 9 is 81,
which taken from 115
the figures ouer it leaues
34, ſo I cancell 9 below,
and 115 abque, ſetting
the remainer 34 ouer
115: againe, 9 times 1
is 9, out of 7 I cannot
take, therefore I borrow 1 out of 4 next it, ſaying, 9 out of 17 reſts 8 ouer 7, and 1 being borrowed from 4 leaues 3 ouer it: againe, 9 times 0 is 0, from 0 leaues 0: laſtly, 9 times 4 is 36, which taken from 801 the figures nereſt ouer 4 leaues 765, which done I remoue the diuiſor againe
one figure forwarder,
and then I haue ouer 3
the firſt figure of the di-
uiſor 33, out of which
the ſaid 3 may be taken
8 times, for 8 times 3 is
24, ſo I put 8 in the quotient, and cancelling 3

11
38
8957
2384901164 | 59
389x044
3910
3
1137
38486
8985705
2384989164 | 59
389x044
389x
1137
38486
8985705
2384989164 | 598
389x0444
389x0
391

the

the firſt figure of the diuiſor, and 33 the figures vncancelled ouer it, I ſet 9 the remainer ouer it, for 24 taken from 33 leaues 9, then I multiply 8 the figure laſt put in the quotient, by 9 the ſecond figure of ỹ diuiſor, ſaying, 8 times 9 is 72, which taken from 97 ouer it leaues 25: againe 8 times 1 is 8, from 6 cannot bee, but from 16 reſts 8 ouer 6, and 4 ouer 5 net before it: againe, 8 times 0 is 0, from 5 reſts 5: laſtly, 8 times 4 is 32, from 56 leaues 24, which being done, I remoue the diuiſor one figure more forward, and then ouer 3 the firſt figure of the diuiſor is 24, out of which 3 may bee taken 6 times and 6 will remaine, then 6 times 9 is 54, which taken from 68 leaues 14: againe, 6 times 1 is 6, out of 2 ouer it cannot bee, but out of 12 reſts 6 ouer 2, and for 1 borrowed from 4, leaues 3 ouer 4: againe, 6 times 0 is 0, from 4 reſts 4: laſtly, 6 times 4 is 24, which taken from 44 leaues 20, and ſo is the worke finiſhed, and I thinke

24
3 9 8
1 1 3 7 8
3 8 4 8 8 2
8 9 8 7 0 8 4
2 3 4 0 9 0 1 8 4 | 598
3 9 1 0 4 4 4
3 9 1 0 0
3 9 1

1
8
2 4 3
3 9 8 4
1 1 3 7 8 6
3 8 4 8 8 2 2
8 9 8 7 0 8 4 0
2 3 4 0 9 0 1 8 4 | 5986
3 9 1 0 4 4 4 4
3 9 1 0 0 0
3 9 1 1
3 9

thinke well, for in the quotient is 5986, and ſo often is 39104 contained in 234090164, and the ouerplus remaining vpon the diuiſion is 13620, which what it is I am altogether ignorant vntil you pleaſe to inſtruct me therein, but in the meane time I pray you ſhew me how to proue my diuiſion whether I haue done well or not, when I am alone without a tutor.

Theod. To doe that, multiply the quotient number by the diuiſor, and to the product adde the remainer, if there be any, then if the totall product containe the ſame quantity, and the like figures in all reſpects that the dividend doth, your worke is true, or elſe not.

Iuni. That will I proue in my laſt example, the quotient is 5986, and the diuiſor 39104, which being greateſt I ſet vppermoſt, and multiplying the one by the other, the product is 234076544 vnto which I adde the remainer 13620, the totall ſum of all together is as you ſee equall, and in all reſpects like to ỹ dividend.

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  39104
   5986
 ------
 234624
 312832
 351936
 195520
 ------
234076544
  13620
 ------
234090164
```

Theod. You haue done right, and therefore we will now proceed to the next rule called Reduction, which indeed is no rule, but onely the vſe and practiſe of the two former rules.

Iuni. With all my heart, I pray you explaine the order thereof, and I will be attentive.

Reduction.

Reduction.

Theod. REduction is the manner how to reduce or bring any ſum whether it be of number, weight, or meaſure, from one denomination to another, retaining ſtill the firſt value; as of Money, one ſhilling reduced into pence is 12 pence, which is of a contrary denomination to ſhillings, and yet one ſhilling and 12 pence are alike in value. Therefore whenſoeuer you haue ſhillings to bee reduced into pence, multiply the number of ſhillings by 12, becauſe 12 pence is in one ſhilling: and likewiſe to bring any other number from a groſſe ſum or denomination to a more ſubtill and leſſe denomination, you muſt marke how many of the leſſe is contained in each of the greater, and by that number muſt you multiply the groſſe ſumme: againe, to reduce any quantity of a leſſe or ſubtill denomination into a groſſe ſumme or greater denomination, you muſt diuide the ſaid ſumme of the leſſer denomination, by ſo many as is of the ſame leſſer contained in the greater, and the product of the one or the quotient of the other doth ſatisfie the demaund,

as

as for example, to know how many pence is contained in 24. shillings, multiply 24 by 12, and the product is 288, and so many pence is contained in 24 shillings: againe, to know how many shillings is contained in 288 pence, I diuide 288 by 12, and there is in the quotient 24 as before, whereby you may see by the first, that in 24 shillings is 288 pence, and by the second in 288 pence is 24 shillings, so the one is the proofe of the other.

24
12
48
24
288

288 | 24

Iuni. I thinke I vnderstand it thus, as if I had 3564 pounds to be reduced or turned into nobles, first I consider that in euery pound is three nobles, by which reason (being there will be more nobles then pounds) I multiply by 3, and the product is 10692, and so many nobles are in 3564 pounds: againe, in 10692 nobles to know how many pounds, I diuide 10692 by 3, and the quotient is 3564, as before.

3564
3
10692

10692 | 3564

Theod. I perceiue that you vnderstand the order of the rule, therefore to make you well acquainted with the vses of the two former rules, I will only propose certaine questions for you to make a resolution thereof thereby to auoide tediousnes, and first tell me in 354 shillings how many pence.

Iuni. Because there is 12 pence in euery shilling,

I multiply 354 the number of shillings by 12 the number of pence in each shilling, and the product of the multiplication being added together is 4248, and so many pence is in 354 shillings.

354
12
708
354
4248

Theod. In 354 pounds, how many pence?

Iuni. Euery pound containes 20 shillings, therefore first I multiply by 20, & the product is 7080 shillings, the I multiply 7080 shillings by 12, and the product is 84960, and so many pence are in 354 pounds.

354
20
7080
12
14160
7080
84960

Theod. The worke is right, but yet you might haue done it at one working by multiplying 354 by 240, the number of pence contained in a pound.

Iuni. Yea marry, but euery one knoweth not how many pence is in a pound so readily as in a shilling.

Theod. Then knowing that in one shilling is 12 pence, and one pound is 20 shillings, you may multiply 20 by 12, and the product will be 240: the contents of which, and of all such like, he that will be a ready Arithmetician should haue them in memory, but I make no question but you will haue all perfect hereafter, and now againe tell mee how many pounds is in 35657 pence?

20
12
40
20
240

Iuni. Being that there will be a lesser number of pounds then there is of pence, I muſt worke by diuiſion and as you taught me, knowing that euery pound is 240 pence, therefore I diuide the totall ſum of pence by 240, and the quotient is 148, and there is remaining vpon the diuiſion 137 which I know not how to apply.

21	
24	
2203	
35657	148
24000	
2444	
2	

Theod. Firſt in your diuiſion note this, that whenſoeuer your diuiſor hath any ciphers after the other figures, cut off ſo many of ỹ laſt figures of the diuidend, as there is ciphers in the diuiſor after the ſaid other figures, & diuide by the reſt of ỹ figures of the diuiſor, as in this laſt example, wheras you did diuide by 240, you might haue ſet downe your worke thus, the 0 vnder 7 the laſt figure of the diuidend, with a dáſh to ſeuer it from the other figures, and diuide onely by 24, for

3565	7
24	10

loke how many of the laſt of the diuiſor be ciphers, ſo many of the laſt figures of the diuidend will be in the remainer vncancelled, and for the remainer vpon any common diuiſion, loke what denomination the deuiſor is of, the like is the remainer; for if you diuide by pounds, the remainer ſhall be pounds, if by ſhillings ỹ remainer ſhall be ſhillings, if by pence the remainer ſhall be pence, and ſo of any other denomination whatſoeuer, and this for whole numbers is a ſufficient direction, but when we come to treat of fractiõs you ſhal learne more particularly thereof.

Iuni. Then by this inſtruction I conclude that in 35657 pence is 148 pound, and being that I diuided by

by pence, therefore the remainer is 137 pence, which againe I diuide by 12 to bring it into shillings, and I haue in the quotient 11 shillings & 5 remaines, which being that I diuided againe by pence is also 5 d. and so for answere to your question, I say that 35657 pence is 148 pound 11 shillings and 5 pence.

5		
137	12	
12		
1		

Friend. You haue answered it very well, therefore I will propose one question more of the reduction of money, and then we will proceede to the reduction of other things of contrary denomination, & that is this. A Coftalichian deliuereth forth at London 234 pounds sterling, which at his comming to Burdeaux hee is to receiue in peeces of French money called a Soulre, the question is how many Soulres his 234 pounds comes to, euery 5 Soulre French valeuing 6 pence sterling.

Iuni. First, if 5 Soulre be 6 pence, then 10 Soulres is a shilling, therefore I multiply 234 pound by 20 to bring it into shillings, and the product is 4680 shillings i againe, being that 10 Soulres are equal to 1 shilling, I multiply the number of shillings by 10, & the totall product being 46800 is the iust number of Soulres which hee is to receiue for his 234 pound sterling: for proofe whereof, being that 10 Soulres are a shilling, I diuide 46800 Soulres by 10 as you see here, cutting off the last cipher both of the di-

234		
20		
4680		
10		
46800		
4680	0	4680
1	0	

uiſor and diuidend being both ciphers, and becauſe 1 doth neither multiply nor diuide, I put all the reſt of the diuidend in the quotient, which is 4680 ſhillings, to bring which into pounds, I diuide the ſaid number of ſhillings by 20, cutting off likewiſe the 2 laſt ciphers of the diuiſor and diuidend, and diuiding onely by the figure 2, the quotient is 234 pounds iuſt as before, ſo that by theſe few examples I thinke my ſelfe reaſonable ſufficient for the reducing of any money from one denomination to another, but that I am ignorant of the value of many ſorts of Coynes, as well Gold as Siluer, which vnleſſe the perfect value be knowen, cannot be reduced.

4 6 8	0	2 3 4
x x x	0	

Theod. That doubt was well remembred, therefore for your further ance marke well this Table following, which ſetteth downe the certaine value of moſt ſeuerall quantities of Coynes currant in this Realme, as alſo ſome of forraigne places.

And firſt		Pound.		20 ſhillings.
theſe are		Marke.		13 ſhil. 4 d.
vſuall eng-		Angell.		10 ſhillings.
liſh quan-		Noble.		6 ſhil. 8 d.
tities and	the	Crowne.	containeth	5 ſhillings.
Coynes of		Shilling.		12 pence.
Siluer,		Great.		4 pence.
where the		Peny.		2 halfe d.
leaſt value		Halfe pē.		2 farthings.

is a farthing, of which, 4 make a peny: yet neuerthe-leſſe, for the reducing of money into diuers parts, there is by imagination a ſmaller portion called a Myte, of which 6 is a Farthing, and 24 make a peny ſterling:

thers

there is alſo the Teſter or halfe ſhilling which is 6 d. and the Scotch Marke which is 13 d. ob. and of gold Coynes, there are diuers ſorts of diuers Countries, whoſe waights and values followeth: Where you muſt note that the firſt 4, viz. the Pound, the Marke, the Angell, and the Noble, are no ordinary Siluer Coynes, but quantities, ſo named for the more ready reckoning of great ſummes of money, and now to ſee how you conceiue of this, tell me if you can how many pence is in 125 pounds.

Iuni. Firſt, I conſider that in a pound is 20 ſhillings, and in a ſhilling is 12 pence, therefore I multiply 125 by 20, and the product thereof is 2500. which is the number of ſhillings contained in 125 pounds: then againe I multiply 2500 ſhillings by 12 the number of pence in each ſhilling, and the toall product is 30000, and ſo many pence is contained in 125 pounds.

	125
	20
	2500
	2500
	12
	5000
	2500
	30000

Theod. You haue done well, but yet you might haue multiplied 125 the number of pounds, by 240 the number of pence in each pound, and ſo it would haue beene done with one multiplicatiõ, as here you ſee that 125 multiplyed by 240, the product is 30000 as before: and now if you can tell me in 30000 pence how many pounds there is, I ſhall thinke my time well beſtowed.

	125
	240
	5000
	250
	30000

Iuni. Truely the former example is ſo plaine that it cannot but make theſe very eaſie, for whereas before you multiplyed 125 pound by 240 pence, to bring the totall into pence, ſo now I diuide 30000 pẽce by 240, the number of pence in a pound, and the quotient thereof is 125 as before.

```
X
X
X62X
3000|0 |125
2444|0
 22
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Theod. One queſtion more of the reduction of money, & then we will proceed. A Marchant of London hath deliuered ſo much wares to another Marchant of Edenbrough as commeth to 235 pounds ſterling, which he is to receiue all in Scotch Markes valued at 13 ſ. ob. the pẽce, the queſtion is how many Scotch Marks he muſt haue to make vp the ſumme aforeſaid.

Iuni. Becauſe the pẽce conſiſts of an odde halfe peny, firſt I turne the 235 pounds into ob. by multiplying 234, by 480 the number of ob. in euery pound, and the product thereof is 112800 which is the number of ob. contained in 235, the which totall ſumme of ob. I diuide by 27, becauſe that the foreſaid pẽce of money being 13 ſ. ob. is 27 ob. and I find by working accordingly, the quotient to be 4177, and 21 remaining vpon the diuiſion, therefore I conclude, that to pay 235 li. ſterling in the pẽces aforeſaid, he muſt deliuer 4177 of ſcotch

```
235
480
18800
940
112800
 21
 277
 2441
XXX8000|4177
 27777
 222
```

Markes

Markes and 21 ob. or 10 d. ob. which being vnder the value of a Marke, he muſt be content to take in ſome other Engliſh Coyne, and ſo I hope your queſtion is anſwered to your expectation.

Theod. It is well done, therefore now wée will proceéd to your Reduction of time and the parts thereof, where you muſt note that the greateſt meaſure of time ordinary amongſt vs is a yeare; euery yeare containeth 13 Moneths, euery moneth 4 Wéekes, euery wéeke 7 dayes, euery day being a naturall day 24 howres, and the artificiall day 12 howres. I call them a naturall day which includes both the day and night being the reuolution of the Sunne, Mone, & Starres, round about the earth, as alſo of the whole heauens, and the day artificiall, I call that of the Equinoctiall, when the day and night are equall of 12 houres a péece, although indéed the time of the Sunnes being aboue the horizon, that is, from his riſing to his ſetting how many or few houres ſoeuer it is, is called commonly a day artificiall, but whenſoeuer we haue to make a reckoning of time, conſiſting of yeares, moneths, wéekes, and dayes, wee reckon vpon the day naturall onely, which as I ſaid before conſiſts 24 houres, and euery houre of 60 minutes: and now not to trifle away the time, if you conceiue well what I haue here ſpoken, ſée if you can tell me how many houres is contained in 135 yeares.

Ium. To reſolue your queſtion, firſt, I multiply 135 the yeares by 13, the moneths in each yeare, and the product being 1755, is ſo many moneths which I multiply againe by 4, the weekes in each moneth, and the product being 7020 I multiply by 7, the dayes in each weeke, and the product being 49140, I multiply againe by 24 the number of howers in a naturall day, and the totall product therof is 196560 which ſome is the true number of howers contained in 135 yeares: and further, if you will I can (by multiplying the laſt product by 60) tell you how many minutes are in ſo many yeares, and by the ſame order of working, how many moneths, weekes, dayes, houres, and minutes it is ſince the Creation of the world, or the birth of Chriſt, or any ſet number of yeares whatſoeuer.

135	
13	
405	
135	
1755	
4	
7020	
7	
49140	
49140	
24	
196560	

Theod. Say you ſo, it is a bold proffer of ſo young a practiſer, but to ſay the truth, you haue ſhewed ſuch a readines in the former, that I cannot any way doubt the performance of the latter; neuertheleſſe, being that practiſe is the onely path to perfection, I will try you in a queſtion of your owne promiſe, which is this, my deſire is to know how many moneths, weekes, dayes, houres, and minutes it is ſince the birth of Chriſt to this preſent inſtant of time that I propoſe the queſtion to you.

Inni. Firſt, I conſider that this is the yeare 1604, the twentieth day of June, halfe an houre paſt 2 of the cloche in the after noone. Therefore I multiply 1604 by 13 the moneths in each yeare, and the product is 20852 moneths in ſo many yeares, then from the Feaſt of the birth of CHRIST (which was the 25 of December) to this preſent 20 of June, is 6 moneths, one weeke, and two dayes; the 6 moneths I adde to the former product, and keepe 1 weeke & 2 daies in mind, ſo the whole product of moneths being 20858, I multiply by 4 the weekes in each moneth, the product is 83412 weekes, to which I adde one weeke which I kept in mind before, ſo the whole being 83423, I multiply by 7 the dayes in each weeke, and adding the 2 odde dayes before which I kept in mind, the totall is 583963 dayes; but now for to bring them into houres I am ſomewhat to ſeeke, by reaſon that it is 2 houres $\frac{1}{2}$ after noone, and I know not at what time the day begins and ends, therefore I know not how many houres to appropriate to that time.

1604	
13	
4812	
1604	
20852	
20852	
6	
20858	
4	
83432	
1	
83423	
7	
583961	
2	
583963	

Theod. For your inſtruction therein, you muſt underſtand, that the Aſtronomers begime the day at noone,

none, and end it at the next none, therefore you may conclude, that being 2 houres and a halfe after none, it is ſo much towards the nert day.

Iuni. Nay, if it be no otherwiſe, I ſhall doe well inough with it; and to goe forward, I multiply the laſt totall by 24 the houres in each day naturall, and the product being 14016792, I adde the 2 odde houres therewith, reſerving the halfe houre to adde to the minutes, and laſtly, I multiply the totall product by 60 the minutes in each houre, and to the product I adde 30 minutes for the halfe houre, and the total number of minutes from the time aforeſaid to this inſtant is 841007670 minutes, and therefore I hope your queſtion is anſwered according to your expectation, and if there be any other kinde of Reduction, I pray you explaine it to me, and I will be attentive.

	584033
	24
	2336132
	1168066
	14016792
	2
	14016794
	60
	841007640
	30
	841007670

Theod. Truely, being that you haue done theſe former queſtions with ſuch derterity, I make no doubt, but that marking the method therof, you will very eaſily paſſe through any queſtion of the like ſubiect: notwithſtanding, becauſe I would not haue you ignorant in any thing that may further your knowledge, I will ſhew you ſomewhat of the diuerſity of Meaſures, and Waights, and ſo proceede further, wherein you muſt note that the leaſt meaſure now in vſe is a Barly corne, of which 3 make an inch, 12 inches make foote, 3 foote a yard,

yard, 5 ſote a pace, and 1000 paces make a mile, which is the greateſt meaſure vſed in common matters; albeit that for other mathematical matters there are greater meaſures, viz. 3 miles make a League, 20 leagues a degree, and 360 degrees is the whole compas of the world, which comprehends all meaſure.

There are alſo other meaſures pertaining to Land meaſure, as Poles, Rodes, Furlongs, day-workes, & Acres; alſo, for meaſuring of Cloth, there is the Elle, and the Yard, with the parts thereof: alſo diuers ſorts of concaue meaſures, as the Pint, the Quart, the Pottle, the Gallond, the Pecke, the Buſhell, the quatter, &c. Of Waights, a Graine is the leaſt, and a hundreth waight ỳ greateſt; of all which, becauſe there are diuers ſorts too tedious to be remembred by telling you of them, I will gather them into ſeuerall Tables, according to their ſeuerall natures, as well waights, as meaſures, with euery one their Contents and quantities, that therein (as in a Regiſter) you may looke and finde your deſired content. And therefore not to prolong the time with ouer tedious diſcourſes, I will leaue you to theſe few Tables here immediatly following, in which (as in a glaſſe) you ſhall ſee the Contents and diuerſities of the moſt ordinary meaſures, waights, numbers, quantities, and other dimenſions whatſoeuer, now commonly vſed in England.

Meaſures

Meaſures.

Although the variety of Meaſures be great, and in a manner infinite, yet are they all comprehended vnder three generall kinds, namely, Lines, Superficies, and Bodies.

Lines, which haue but only length without breadth, or thickneſſe, doe meaſure heights, depths, lengths, and breadths of all things whatſoeuer.

Superficies, are limitted by lines, and beare both length and breadth, but no thickneſſe; in this meaſure are giuen the contents of Glaſſe, Boards, Pauements, and Land of all ſorts.

Bodies are bounded by Superficies, and containe both length, breadth, and thicknes, theſe doe manifeſt as well the quantity of all ſollide things, as Timber, Stone, and ſuch like, as alſo the content of Concaues of euery kinde.

MEASVRES CONCAVE.

OF

Beere, *and* Ale.

One barrell containeth.			
Kilderkins.	2	2	Butter & Sope
Firkins.	4	4	haue the like mea-
Gallonds.	36	32	ſures, but diffe-
Pottels.	72	64	ring in their ſeue-
Quarts.	144	128	rall waights only.
Pints.	288	256	

Wine, Oyle, & Hony.

One Tunne containeth.	
Pipes or But.	2
Punchions.	3
Hogſhead.	4
Tierces.	5
Barrels.	8
Rundlets.	12
Gallonds.	252
Pottels.	504
Quartes.	1008

Graine.

One Laſt of Corne or Grain containeth	
Quarters.	10
Coombs.	20
Strikes.	40
Buſhels.	80
Half-bu.	160
Pecks.	320
Gallon.	640
Pottl.	1280
Quart.	2560

One Laſt containeth	Salmon & Eels.	
Buts.	6	
Barrels.	12	
Firkins.	48	
Gallond.	504	

One Laſt containeth	Salt.	
Wates.	10 1/7	
Buſhels.	420	

Meaſures

Meaſures of Superficies.

One Acre cõtaineth			One Pyle containeth	
	Halfe Acres.	2	Furlongs.	8
	Rods.	4	Scores.	88
	Halfe Rods.	8	Perches.	320
	Dayes worke.	40	Paces.	1056
	Square Perches.	160	Elles.	1408
	Yards.	4804	Yards.	1760
	Fete.	43560	Fet.	5280
			Inches.	63360
			Bar. corn.	190080

Waight, and Number.

	Iron.			Lead.	
A Tun containes.	Hund.	20	A Fodder containes.	Hund.	19½
	Pou.	2240		Pounds.	2184
	Herrings.			Leather.	
A Laſt containes.	Thouſa.	10	A Laſt containes.	Dickers.	20
	Herr.	12000		Hydes.	200
	Paper.			Parchment.	
A Bale containes.	Reames.	10	A Rowle contains.	Dozens.	5
	Quires.	200		Skinnes.	60
	Sheets.	5000			

A yeare contayneth			A Ri. con. tayneth		
	Quarters.	4		Nobles.	3
	Moneths.	13 1/13		Crownes.	4
	Weekes.	52 1/7		Shillings.	20
	Dayes.	365 1/4		Groats.	60
	Howers,	8766		Pence.	240
	Minuts.	525960			

Waights.

	Wooll.		Cheese.	
One Laſt contayneth	Sackes.	12		
	Waighs.	24		
	Todes.	156		
	Stones.	312		
	Clues.	629	One Waigh contains Clues.	32
	Pounds.	4368	Pounds.	256

	Butter.	Sope.
	Pl.	Pl.
One Barrell containeth	224	240
One halfe Barrell containeth	112	120
One Firkin.	56	60

Cattles.

Carſies.

	Length yards.	Breadth. yards.	Waight pounds.
Carſies called ordinary, the Peece.	betweene 16 and 17 wet.	1	19
The ſorting Carſie.	betweene 17 and 18 wet.	1	22
The Denſhire Carſie.	betweene 12 and 13 wet.	1 ¼	1 {euery yard.
The checke Carſie & the Straite.	betweene 17 and 18 wet.	1 wet.	24

Cottons.

A Lancaſhire Cottō.	21 or 20 go.	¼ within ½ liſt.	21
A Goad of welſh co.	1 ½	½ wet.	1 ⅝
Euery yard of cottō.	1	¼	1
The cotton of Manchester & Cheſhire.	22 goads.	¼ wet.	30

Sizes of Cloath of all ſorts.

Narrow Cloath.	Length yards.	Breadth yards.	Waight pounds.
Euery narrow Cloath of the ſame places or any other of like ſort.	betweene 24. and 25 wet.	1	34
Euery Northern Cloath.	betweene 23 and 25.	1¼ wet	66
The halfe Peces called Dozens.	Containeth the ſame breadth and halfe the ſame length & waight.		
The Penſtone, or Forreſt white.	betweene 12. and 13 wet.	1 ½	28
The white plaine Straight made in Deuon, or Cornew.	12	1	22
White pinned Straits of the ſaid places.	11	¾	8

Cloath of all ſorts.

Broad Cloath.	Length yards.	Breadth yards.	Waight pounds.
Euery white and red made in Wiltſh. Glouc. and Sommerſet-ſhire or elſewhere, of like making, & all other whites made in any part not before named.	betwæne 26 and 28	1 3/4	61 white. 60 colored.
Cloath of Ray.	28, watered 24.	1 1/2	
Euery broad Plunket a ſure blew, and other colored cloath, made in Wiltes, Glouceſter, and Sommerſetſhire, or elſewhere, of like making.	betwæne 25, and 28 wet.	1 1/4	88
Euery courſe ſhort cloth made in Suffolke, Norf. Eſſex, & elſewhere of like ſort, and euery courſe Kentiſh Cloath, not aboue fiue pound price.	betwæne 23 and 25 wet.	1 1/8	64
Euery Broad-cloath made in Taunton bridge or elſewhere of like ſort.	betwæne 12 and 13 wet.	1 1/4	34

Frize

Friſe and Rugges.

The Lancaſh. Friſe and Rugge.	betwéne 35, & 37.	¾	43
Mancheſter Friſe and Rugge.	36	¾ wet.	48
Welſh Friſe Flannell.	36 wet.	¾ Ells.	48

Euery péce of Flannell vncertaine ⅓.

Number onely.

Fiſh.

Ling.
Codde or Haberdine. { 124 / 120 } to the hundreth.
Stockfiſh.

Furres.		Skinnes of Leather.
Sables. Parterns. Pinks. Jenits. Filches. Grayes.	40 Skinnes the Timber.	Goats the kippe, 50. Calues the Dozen, 12.

Conie. Kidde. Lambe. Budge. Catte.	Fiue ſcoze the Hundr.	Shéepe. Lambes. }	the hundreth fiue ſcoze.

By acquainting your ſelfe with theſe former Tables, you may practiſe this Rule in other Queſtions at your more leyſure by your ſelfe, and now at this time wee will proceed to the explanation of the next Rule which is called Progreſſion, which as it is not much in vſe (ſeruing rather for pleaſure and for exerciſe of the wit, then for any needfull occaſion, ſo many writers of Arithmeticke haue omitted to write thereof) notwithſtanding, becauſe it is not vnneceſſary to know as much as may bee, therefore I purpoſe (though with ſome more breuity then in other Rules) to treate of the ſame.

Iuni. I pray you ſhew mee firſt what Progreſſion is, with the order thereof, and as in other rules ſo in this I will be diligent to marke your direction, and to doe thereafter.

Progreſſion.

Progreſſion.

Theod. PRogreſſion is a going forward, or an orderly encreaſe of number by any certaine quantity, and the working thereof, as a kind of quicke and ready addition of diuers numbers into one, of which Progreſſions there are 2. ordinary kinds; the firſt is called Arithmeticall Progreſſion, and the other Geometricall. Progreſſion Arithmeticall, is that which doth encreaſe by any certaine number in manner of Addition, as by 1, 2, 3, 4, or 5, as if it encreaſe by 2 the firſt place or tearme being 2, the next muſt be 4, the next 6, then 8, ſo ſtill increaſing by 2, or if it encreaſe by 4, the firſt tearme being 2, the next is 6, the next 10, then 16, and ſo of the reſt: where you muſt note, that to make a briefe or ſpeedy reckoning of the ſeuerall tearmes or places of Progreſſion, to bring out the totall product without common addition, there is three things to be conſidered; Firſt, the beginning or firſt number of the Progreſſion; ſecondly, the number of the places or tearmes; and laſtly, the number of the laſt tearme or place of the ſayd Progreſſion: and alſo whether the number of places be euen or odde, if they be euen, ſet the number of the places by it ſelfe, then adde the firſt number and

the laſt together, and that totall multiply by halfe the number of the places aforeſaid, which product is the ſumme of all the numbers of the progreſſion.

Iuni. By your leaue I will trie it by one example thus, of a Progreſſion Arithmeticall, 2, 4, 6, 8, 10, 12, 14, 16, the places are 8, which being euen I ſet it by it ſelfe, then the firſt place being 2, I adde with the laſt place which is 16, both makes 18, which 18 I multiply by 4 halfe the number of the places, and the product being 72, is the totall Summe of all the numbers of the progreſſion, which by common addition is ſo alſo, now it reſts how to worke when the number of the places are odde.

Theod. As in the other you multiplyed, the firſt and laſt number added together by halfe the number of the places, ſo when they are odde, multiply the whole number of the places by halfe of the firſt and laſt places added together, and the product is your deſire as before. Or you may for your better remembrance take this for a generall Rule, viz. multiply the halfe of the euen number by the whole odde number, namely of the two numbers before rehearſed, viz. the firſt and laſt added together, and the number of the places; for it may ſo fall out that ſometimes the one will be odde and the other euen, and otherwiles the contrary, but both odde they will neuer be. This is ſufficient for the rule onely of Progreſſion Arithmeticall; and now I will ſhew you the rule for Geometricall Progreſſion, and for the practiſe of them both I will ſhew it afterward by example.

Progreſſion Geometricall is, when the termes or places of the ſaid progreſſion containe the numbers

next

next before, double, treble, or oftner, as if the firſt tearme or place be 2, the next 4, and the next 8, that is in a double proportion, and if the firſt place be 2, the next 6, and the next 18, that is in a treble proportion, &c. and to find readily the totall ſumme of all the numbers in any Geometricall Progreſſion. Conſider firſt with what number your progreſſion is increaſed as by 2, 3, 4, 5, or any other, and by that number by which it is encreaſed or multiplyed (for indeed this kind of Progreſſion is rather increaſed by a kind of multiplycation, then of Addition, as the former) you muſt multiply the laſt number of the Progreſſion, from which totall muſt be deducted the firſt number or place of the ſaid Progreſſion, and the remainer being diuided by a number leſſer by one then that which it was multiplied by, the quotient gines the totall ſumme of all the Progreſſion.

Iuni. This ſeemeth to mee very darke as yet, therefore I pray you explaine it to me by an example.

Theod. Then marke me thus, the firſt number of a Progreſſion being 2, is to bee continued in a treble proportion 6 times, in this manner, 2, 6, 18, 54, 152, 456, where you ſee the firſt being 2, the ſame multiplyed by 3 is 6, which againe multiplyed by the ſame multiplier 3 is 18, and ſo by conſequence the laſt number of the ſaid Progreſſion is 486, then becauſe the Progreſſion is in a treble proportion, I multiply 486 by 3, and the product is 1458, from which taking the firſt number of the ſaid Progreſſion which is 2, the remainer is 1456, now being that to make this ſaid nmber it was

486	
3	
1458	
2	
1456	

multiplyed by 3, therefore it muſt be diuided by a number leſſe then it by one which is 2, the quotient being 728, is the totall ſumme of all the numbers in the ſaid Progreſſion.

CX	
CXXVI	728
CXXII	

Iuni. If this be all, I hope with ſome few queſtions working of either kind, to be reaſonably perfect therein, for now mee thinks I vnderſtand the order thereof.

Theod. Before wee come to worke by this rule, I will ſhew you one thing which is very neceſſary, and that is this. Sometimes you may haue a queſtion to worke in progreſſion of either kind, which ſhall conſiſt of very many tearmes or places, and to ſet them all downe ſeuerally, thereby to know the laſt number of the progreſſion would bee very tedious; to preuent which, take this rule in your memory, for Arithmeticall progreſſion. Multiply the number with which your progreſſion is increaſed, by one leſſe the the number of your tearmes or places, and putting to the product the number of the firſt tearme, that totall will bee the number of the laſt tearme or place of your ſaid progreſſion.

Iuni. This is a moſt excellent Rule and worthy obſeruation, without which a great time would be puzled away, before we ſhall come to know the laſt place, whereas by this wee ſhall néde to know no more but the firſt place, the excelle of the Progreſſion and the number of the places, for all the reſt is giuen hereby; now then proceed when you pleaſe to the practiſe hereof.

Theod. A certaine man bought of another a houſe and

and Land, for which hee was to pay euery Sonday throughout one whole yere by Arithmetical progreſſiõ, viz. The firſt ſunday 3 ſhilling, the nert 6 ſhillings, the nert 9, and ſo each exceeding the former by 3 ſhillings, the queſtion is, what he paid for his farme?

Iuni. Firſt, as you taught mee to know what the laſt payment was, I conſider that there is 52. Sundaies in a yeare, and conſequently the number of the tearmes muſt be 52: therefore I multiply 51, which is 1 leſſe by 3, the number by which the Progreſſion is encreaſed, and the product is 153, vnto which I adde 3 the firſt number of the progreſſion, and the totall is 156. ſhillings, which is the laſt payment: then to know the totall what all the payments in the whole progreſſion comes to, I adde the number of the firſt tearme being 3, to the number of the laſt tearme 156, and the totall being 159, I multiply by 26 which is halfe the number of the tearmes or places, which done, I find by my worke that hee ſhould pay for his farme in all 4134 ſhillings which being reduced according to the rule is 206 pounds, 14 ſhillings.

51	
3	
153	
3	
156	
156	
3	
159	
26	
954	
318	
4134	

Theod. It is well done, and now anſwere me to this queſtion. A man being to marry his Daughter, is to pay her portion in this order, viz. vpon her marriage day 5 pound, the nert day a ob. the nert day 2 ob, the third day 3 ob, and ſo euery day increaſing a ob. more then the day nert before, till the end of one whole yere, now

now I would know what his daughters portion came to when it was all paid.

Iuni. As before, ſo now I note that in a yeare is 365 dayes, and therefore there is ſo many tearmes in this progreſſion; and to know the number of the laſt tearme, I multiply 364 which is 1 leſſe then the number of the tearmes, by 1 the exceſſe of the progreſſion, which becauſe 1 doth neither multiply nor diuide, it retaines the former number, to which the firſt number of the tearms being 1, likewiſe being added makes the firſt number againe 365, and ſo many ob. ſhall the laſt payment conſiſt of, then adding this firſt tearme which is 1, to the laſt 365, makes 366: and now becauſe that the number of the places being 365 is odde, ſo that I cannot take the halfe thereof, therefore I take the halfe of 366, the firſt and laſt added together, which beeing 183, I multiply 365 the number of the terms or places thereby, and the totall product thereof is 66795, ob. and ſo many ob. ſhall be payd in the whole yeare by the order aforeſayd, which being reduced according to common reduction makes 139 Pounds, 3 Shillings, and 3 halfe pence; vnto which the 5 Pound which

364
1
364
1
365
1
366
183

365
183
1095
2920
365
66795

was

was payd vppon her marriage day, makes 144 pounds, 3 ſhillings, 3 halfe pence, for the totall ſumme of her whole portion, and ſo I hope I haue anſwered your queſtion.

4			
x 67			
2837			
6679	5	132	
4888	0		
44	x3		
	75	3	
	x4		
li.	s.	d.	
139	3	1 ob.	

Theod. You haue ſo, therefore one queſtion more concerning progreſſion Arithmeticall, and then we will proceed, and that is this. A man hath 468 miles to goe in 12 daies in an arithmeticall progreſſion; the queſtion is, with what number of miles to begin, and continue the increaſe of his iourney.

Iuni. To doe this requires your helpe, for vnleſſe I knew the firſt number and the increaſe, I am neuer the better for the number of the tearmes.

Theod. Then take this for a generall Rule for all ſuch like Queſtions; adde 1 to the number of the tearmes, and that totall multiply by halfe the number of the tearmes, if they be euen, or if they be odde, multiply halfe the totall by the whole number of tearmes, and by the product thereof diuide the other number giuen, the quotient whereof is your number to begin, and continue your progreſſion, as in this example I adde 1 to 12 the number of the tearmes, and it makes 13, which multiplyed by 6 the halfe of the ſaid num-

ber

ber of the tearmes, the product is 78, by which 78 I deuide 468, and in the quotient is 6, which is the number to begin and continue the ſayd progreſſion.

13
6
78

Iuni. If you pleaſe I will make tryall of it.

4
468|6
78

Theod. Doe ſo.

Iuni. Firſt by a contrary I ſay, a man is to trauaile 12 daies, the firſt day 6 miles, the next 12 miles the third 18 miles, euery day going 6 miles more then other, the queſtion is how many miles hée ſhall goe in all: to do which, I multiply 11 which is one leſſe then the number of the tearmes by 6, the encreaſe of the progreſſion, and to the product being 66, I adde 6 the firſt number of the progreſſion, ſo the totall is 72 for the number of miles he is to go the laſt day of his ſayd Iourney; then againe I adde 6 the firſt number to 72 the laſt, and the product being 78, I multiply by 6, which is halfe the number of the tearmes, and the totall product is 468 for the number of myles that he is to goe, in the order aforeſayd, whereby I ſée that the other is true, & alſo that the one is the proofe of the other.

11
6
66
6
72

78
6
468

Theod. You haue done well. Therefore I will onely propound a queſtion or 2 of Geometricall Progreſſion, and ſo proceed to the next rule. A man hath bought a horſe which coſt him 20 pounds, and he hath ſold him againe to bee paid at 14. ſeuerall payments in

a

a Geometricall Progreſſion, in this order, The firſt day a penny, the next 2 pence, the third 4 pence, and ſo euery day double to the next before, the queſtion is, whether hee that bought the Horſe in this order, ſhall get or loſe by his bargaine, and how much?

Iuni. To do this (as in the other kind of progreſſion) I muſt know the number of pence to bee payde at the laſt tearme of payment, which becauſe I know no rule to know it ſodainely, I ſet downe the ſeuerall tearmes or places of the paiments, and right againſt euery tearme ỳ numbers of the Progreſſion anſwerable therto, each being double to the former, ſo that the 14 or laſt payment is 8192 pence: and now to know the totall ſumme of all the particulers, as I learned before, I multiply the laſt ſumme by 2, which is the encreaſe of the progreſſion, and ỳ product is 16384 from which taking 1. the firſt number of the ſaid progreſſion, the remainder is 16383, which is to be diuided by a number leſſe by one, then that which it was multiplied by, which being that it was multiplyed by 2, a nũber leſſe by one, is but one, which doth neither multiply nor diuide, wherfore I ſay that 16383, is the totall ſumme of pence which he

1	1
2	2
4	3
8	4
16	5
32	6
64	7
128	8
256	9
512	10
1024	11
2048	12
4096	13
8192	14

8192
2
16384
1
16383

he muſt pay for his horſe, which brought into pounds by diuiding it by 240, the quotient is 68 pounds, & 63 d. remaining, which is 5 ſhillings and 3 pence, ſo I conclude that he paid in all 68 pound 5 ſhillings 3 pence, which was more then the other payed by 48 pounds 5 ſhillings 3 pence, and if you could teach me a way with more brenity to know the laſt number of a Geometricall Progreſſion, I ſhould thinke my ſelfe ſufficiently inſtructed in this Rule.

43	
496	
16343	68
2440	
2	

Theod. For ſome eaſe to you in ſuch like queſtions, ſet downe ſome of your numbers in a continuall order progreſſionall, and ouer the firſt plare ſet a 0, and ouer the nert the figure of 1, ouer the third 2, and ouer the fourth 3, &c. ſo many as you thinke good, which done, multiply the two laſt numbers together, which product diuided by the firſt number of the progreſſion, the quotient is the number belonging to that place or tearme, which is more by one then the two figures ſtanding ouer the numbers which you multiplyed, being added together, as in this example.

0	1	2	3	4	5	6	7	8	512
2	4	8	16	32	64	128	256	512	256

3072
2560
1024
131072

The two laſt numbers ſet downe are as you ſée 256 and 512, which multiplyed the one by the other, the product is 131072, the ſame diuided

by

by 2 the firſt number of the Progreſſion, and the quotient beeing 65536 is the number belonging to the 16 place, which is more by one than 7 and 8 added together, which are the figures ouer the ſaid two laſt numbers, then if your progreſſion conſiſt of more places, to know the number of the laſt place, as if the whole number of places were 20, take the 16 place aforeſaid from 20, the remainer is 4, vnder which 4 in the places already ſet downe is the number of 32, by which multiplying 65536 the nũber of the 16 place, the product is 2097152, which you muſt diuide by the firſt number of the Progreſſion beeing 2, and the quotient beeing 1048576, is the number for the laſt tearme of the ſayd progreſſion, and this I think to be a ſufficient inſtruction to the Rule of Progreſſion, both Arithmetical and Geometricall, if at your leiſure you take a little paines to propound queſtions therof, and anſwere them by the maner layd down in theſe former examples.

x x
xzxcyx|65536
xxxxx

65536
32
131072
196608
2097152

xxxx
xcyxyx|1048576
xxxxxxx

Iun. I pray you proceed to the next rule what it is, and the explanation thereof.

The

The Rule of 3.

THeod. This Rule is called the Rule of 3. and is ſo called becauſe that by three numbers knowne, is found out a fourth number vnknowen, which fourth number is in the like proportion to the third, as the ſecond is to the firſt, where is to be noted, that if your worke conſiſt of ſeuerall denominations, then the third number muſt be of like denomination to the firſt, and the fourth of the ſecond, as if the firſt bee feet or inches, the third muſt bee ſo likewiſe, and if the third bee ſhillings or pence, the fourth muſt be alſo of the ſame denomination, and as for the commodious vſe thereof, it is the moſt excellent rule of all the reſt, ſo is it as eaſie to bee learned as any of them. The chiefe matter conſiſting in placing of the three numbers in their true places, according to the propounding of the queſtiõ, which being placed as is aforeſaid in their right order, you muſt alwaies multiply the two laſt numbers one by the other, and that totall being diuided by the firſt, the quotient ſheweth the fourth number which is the number demaunded: As if 3 yards of Cloath coſt 4 ſhillings, I would know what 36 yardes of the ſame Cloath ſhould

should sell at the like rate. For the answering whereof I set the three numbers knowen as you see, and to find the fourth I multiply 36 the third number by 4 the second number, and the product being 144, I diuide by 3 the first number,

yards.	s.	yards.
3	4	36
		4
		144

2
3 | 4 4 4 | 48
3 3

and the quotient being 48, is the number of shillings which 36 yards must cost after the rate of 4 shillings for 3 yards.

Iuni. This seemeth vnto mee to be verie easie, being as it were to shew the benefit of the two former rules, viz. Multiplication and Diuision, therefore if you thinke good I will propose and answere a question my selfe, as thus, If 15 pound of Pepper cost 1 pound 12 shillings 6 pence, what shall 1 pound cost, as you taught me I set my numbers in order thus,

——15——1——12——6——1

where the first number being 15, and the denomination Pepper, the third number is 1, and the denomination likewise as the first, and the second number being 1 pound 12 shillings 6 pence, and the denomination money, so must the denomination of the fourth number whose quantity is now sought for, be money, also to finde which I must multiply the last number by the second, or the second by the last, which because the second number is of seuerall names and numbers, albeit of one principall denomination, yet to make it fit for worke, I reduce them all into one denomination of pence, which being so reduced, the totall denomination

of money for the ſecond number of the queſtion is 390 pence, and then will the numbers of my worke ſtand thus; and to finde the fourth number which muſt be the reſolution to the queſtion demanded, I ſée that 1 the third number multiplyed by 390, the ſecond doth neither augment nor diminiſh, therefore diuiding the ſame by 15 the firſt number, there commeth in the quotient for the fourth number 26 pence, which by reduction is 2 ſhillings 2 pence for the price of one pound of Pepper after the rate aforeſaid.

li.	ſ.	li.
15	390	1

390	
1	
15	
39 0	26
15 5	
1	
2	
2 6	2 2
1 2	

ſ.	d.
2	2

Theod. I perceiue that you haue ſufficient inſight into the methode and order of this Rule, the queſtions being ſimply and directly propoſed, and therefore I will onely ſet downe ſome few queſtions to meditate vpon by your ſelfe, with the reſolutions thereto, and ſo wée will proceéd further.

If 25 yards of Cloth coſt 50 ſ. what coſts 1 yard, 25—50—1—*facit*—2 ſhil.

If 9 Elles of Cloth coſt 3 li.—5 ſ.—3 d. how many elles ſhall I buy for 288 li. 9 ſ. 2 d. *facit* 795 Elles 3 quarters.

If 7 buſhels of Wheat be deliuered for 25 ſ. 1 d. how many buſhels are there to be deliuered for 891 li. 8 ſ. 10 d. 1 halfe peny, *facit* 4975 buſhels, 1 halfe.

If

If 32 ſ. 8 d. buye 112 li. waight of Raiſins, how many pounds waight ſhall 1299 li. 19 ſ. 5 d. 1 halfe peny buy, *facit* 89141 li. 02795. 3. 17.

Of all which queſtions I omit the worke to whet your wit at conuenient leaſure, and doe now intend to ſhew you the proofe of this Rule, and leaue to worke in whole numbers, intending to perfect you in the knowledge of a Fraction, by the knowledge whereof you ſhall be the better able to goe through the reſt of ſuch proportionall Rules as are yet to be learned.

Iuni. This doth ſuffice for my inſtruction, for the working of any ſuch queſtion according to the methode of this Rule, but I pray you proceede to ſhew mee the proofe of theſe or any ſuch like queſtions.

Theod. I will giue you one example that ſhall ſerue for all, it ſhall be the ſame queſtion your ſelfe propounded; where you finde as 15 pounds of Pepper doth coſt 32 ſ. 6 d. ſo according to that valued price muſt 1 li. coſt 2 ſ. 2 d. For the proofe of this and all ſuch like Queſtions, you muſt propound your Queſtion backeward, ſaying; If 1 li. coſt 2 ſ. 2 d. what ſhall 15 li. coſt: then multiply and diuide, and you ſhall finde 32 ſ. 6 d. the iuſt valued price of 15 li. and in like manner muſt all queſtions wrought according to the methode of this Rule, be proued.

Iuni. This is ſufficient, for I doe perceiue in the 3 numbers nominated in this laſt queſtion of proofe, that there is a certaine quantity of goods twiſe mentioned, and by the valued price of the firſt quantitie of goods which is 32 ſ. 6 d. for 15 li. of Pepper, the valued price of 1 li. of Pepper the ſecond quantity of goods is found to be 2 ſ. 2 d, and in proofe by the valued price of

a pound being 12 s. 2 d. the valued price of 15 pound to be 32 shillings 6 pence, so that by this example onely I shall bee able sufficiently to proue any other such like questions, therefore I pray you proceed as you haue intended; I earnestly craue of you some briefe preparation toward the vse and knowledge of Fractions.

Theod. My good will is such towards you, that you shall not need to vse any importunate craving for the attaining of that thing, whereby I may be perswaded that I shall any wayes profit you, or helpe your studie in this excellent Art which you so earnestly desire; wherefore I will begin with explication of this name Fraction, what take you it to be?

Iuni. I shall giue iudgement vpon report, and not of knowledge, and that is thus; it is said to bee a broken number or part of a whole thing, and so doe I conceiue of a fraction; but I cannot expresse it perfectly.

How

How a Fraction is expreſſed.

Theod. A Fraction indeed is a broken number, and ſo conſequently the part of another number, but that muſt be underſtood of ſuch another number as cannot bee divided into any other parts then fractions, example; although I may take ſeverall parts of this number 24, as the one halfe is 12, the one third part is 8, the fourth part is 6, and ſo many other parts diverſly, yet theſe parts are not (nor ought not properly) to be called fractions, becauſe they may bee expreſſed by whole numbers, but a fraction properly expreſſeth the parts or part of a unity, that is to ſay, the entire ſumme that a fraction doth expreſſe, it cannot be ſo great that it ſhall make 1, therefore you ſhall underſtand the expreſſing of a fraction, is repreſented by two numbers, ſet one over the other, and a line drawne betweene them, thus, $\frac{1}{12}$ $\frac{2}{3}$, $\frac{3}{4}$, $\frac{5}{5}$, which 4 fractions are to be pronounced thus, one halfe, two third parts, three fourth parts, five fifth parts.

Iuni. I vnderſtand how they are expreſſed and their pronounciation, but of their values I am vncertaine, but I thinke they are thus valued: If a pound of money bee diuided into 2 parts, that firſt Fraction doth expreſſe one of thoſe 2 parts, and the latter Fraction doth ſignifie, if a pound bee diuided into 6 parts, I muſt know him to be 5 of thoſe 6 parts, and ſo conſequently I conceiue of the reſt or any ſuch like: if there be no more difficulty in expreſſing, or numbring of a fraction, I pray you proceed forward.

Theod. There is no more difficulty but onely that you expreſſe the names aright of both numbers which maketh a Fraction, the ouermoſt which is aboue the line is called the Numerator, and the other beneath the line is called the Denominator, the reaſon is, the ouermoſt doth expreſſe the Numerator or number of parts that the fraction doth containe, the denominator and nether number expreſſeth the Denomination or name of parts whereinto the vnity or whole thing is diuided.

Iuni. Are there no other kinds of Fractions which you haue not yet taught?

Theod. There are of Fractions (or that are expreſſed as fractions) 4 kinds, whereof 2 kinds of them are properly fractions, and the other 2 kinds are not properly Fractions, but are commonly ſo expreſſed: this firſt kind which I haue now ſhewed you is truely a Fraction, and before I meddle with any of the reſt, I will ſhew you how to take vp any fraction that ſhall remaine in any diuiſion, when you worke in whole numbers.

Iuni. I pray you proceed according as you intend,

for

for if there ſhould remaine any number in a diuiſion, I know not what it is, for I remember I wrought a queſtion very lately, and there remained 294, my quotient being pounds, I know not how to ſeeke out the iuſt value of this remainer.

Theod. What was your diuiſor in that diuiſion?

Iuni. My diuiſor was 336.

Abbreuiation of Fractions.

Theod. TAke it for a generall rule, when you haue ended your diuiſion, loke what your quotient is your diuiſor ſheweth what denomination or number of parts one of thoſe vnities your quotient is of, is diuided in, and the remainer ſheweth that you haue ſo many of thoſe parts of a whole, ſo that if your quotient were pounds, your remainer being 294, and your diuiſor 336, there remained $\frac{294}{336}$ of a pound, ſo that this Fraction remaining is a ſecond kind of Fraction, and ſuch ſhall you often meet withall, but they are no true Fractions, becauſe they are not expreſſed in their loweſt tearme; Now therefore I will ſhew you how you ſhall take vp this or any ſuch like Fraction.

How to take vp a Fraction that may bee abbreuied.

Theod. FOr the Fraction remaining in your diuiſion, you muſt conſider what part you may

take, or how you may diuide both Numerator & Denominator, if both numbers are euen as this Fraction is, then you muſt practiſe this diuiſion by euen parts, either by $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$, $\frac{1}{16}$, $\frac{1}{32}$, or more euen parts, vntill ſuch time as you cannot take an euen part out of both of them alike, but that there will remaine ſome odde number: then ſeeke ſome odde part or number that will diuide them both, as $\frac{1}{3}$, $\frac{1}{5}$, $\frac{1}{9}$, $\frac{1}{11}$, or more odde parts, but if you can finde no ſuch part to be taken of them, whereby they cannot be brought to a lower denomination, then you muſt name them as you haue found them, Example, $\frac{294}{336}$ take $\frac{1}{2}$ of 294 the Numearator which is 147, and the $\frac{1}{2}$ of 336 being the Denominator which is 168, then for $\frac{294}{336}$ I find $\frac{147}{168}$ and both of one value; becauſe the numerator 147 is an odde number, I ſeeke to take ſome odde part both of the Numerator and Denominator, where I doe conſider the $\frac{1}{7}$ part of either of them may be taken, the $\frac{1}{7}$ of 147 the Numerator is 21, the $\frac{1}{7}$ of 168 the denominator is 24, then for $\frac{147}{168}$ I finde $\frac{21}{24}$ and both of one value, it is an odde number, you muſt yet diuide the fraction, I doe conſider $\frac{1}{3}$ part will diuide them both, the $\frac{1}{3}$ part of the Numerator 21 is 7, and the $\frac{1}{3}$ part of the Denominator 24 is 8, then for $\frac{21}{24}$ I find $\frac{7}{8}$, ſo that $\frac{294}{336}$ of a pound is become $\frac{7}{8}$ which is in value 17 s. 6 d. and there it muſt reſt, becauſe it cannot bee expreſſed in any lower tearme.

Iuni. I haue the vnderſtanding of this manner of the taking vp of a fraction, as you ſhall vnderſtand by an example or two in fractions, which I wil expreſſe and worke my ſelfe after the manner you haue ſhewed me examples, if you would haue me abbreuiate theſe

Fractions.

Fractions.

8	9
136	63
272	693
544	847
612	77
306	11
153	
9	

I doubt not but that I haue here wrought truely, and I am ſure I can take vp any Fraction after this manner; but now they are thus taken vp, I know not their certaine values no more then I did before.

Theod. You haue well done in Abbreuiating your Fraction, if you vnderſtand why they are thus abbreuied.

Imm. I am ſhewed before what it is to expreſſe a Fraction in his loweſt tearme, or to reduce him into his loweſt denomination, and I doe alſo conceaue that his value is neither augmented nor diminiſhed, but that $\frac{8}{9}$ the loweſt tearme is equall to $\frac{544}{612}$ the higheſt tearme, and $\frac{9}{11}$ is equall to $\frac{693}{847}$, and ſo conſequently I am to conceiue and iudge of all Fractions that ſhall be ſo taken vp.

The ſecond kind of Abbreuiation.

Theod. I Will then proceed to a ſecond kinde of Abbreuiation or taking vp of a Fraction, if you ſhould ſo happen to meet with a fraction, that you cannot

not ſodainely conſider of any part or number that will diuide both numerator and denominator.

Iuni. I pray giue an example of ſuch a Fraction, for I thought that any Fraction might haue béene taken vp, or abbreuied after this manner.

Theod. So they may, but they would ſéeme more tedious, then by this ſecond kind (example) I would haue you to abbreuiate $\frac{3077}{4163}$.

Iuni. This Fraction troubleth me very much, I cannot conſider of any number that will diuide both Numerator and Denominator, I am now at a nonplus without your helpe.

Theod. The manner of abbreuiating this or any ſuch like Fraction, is thus; you muſt diuide the denominator 4163 by your numerator 3077, the remainer of your diuiſion will be $\frac{1086}{3077}$, then diuide that laſt denominator 3077 by the laſt numerator 1086, and there will remaine $\frac{905}{1086}$, then diuide 1086 by 905, there will reſt $\frac{181}{905}$, then diuide 905 by 181 and there will remaine nothing; ſo that you are to note when you haue diuided firſt your denominator by your numerator, and then the diuiſor of euery diuiſion ſo often by the remainer that there remaineth nothing, that laſt diuiſor is the number that will diuide your fraction, both numerator and denominator: example, if you diuide 3077 the numerator of your Fraction by 181 which is your laſt diuiſor, you haue in your quotient 17, which is the 181 part of 3077, then diuide 4163 your dividend by 181, you haue in your quotient 23, ſo that $\frac{3077}{4163}$ is $\frac{17}{23}$, as this example ſheweth.

Iuni. I vnderſtand your manner of worke very well; if you pleaſe I will worke this Fraction after the

the ſame manner, I would haue $\frac{3\,1\,9}{7\,1\,3}$ abbreuied or brought into his loweſt denomination; I make no doubt but I haue anſwered the queſtion truely, for I finde $\frac{3\,1\,9}{7\,1\,3}$ by order of worke to be $\frac{17}{38}$, as the example ſheweth, & I find as it appeareth 197 to be the number that diuideth both numerator and denominator.

Theod. You haue well done, yet notwithſtanding if you can (without that diuiſion) by memory eſpie the greateſt number that may diuide exactly both tearmes of your Fraction propounded, then need you not to vſe that diuiſion, as in this fraction $\frac{108}{129}$ you may eaſily ſée that 12 is the greateſt number that will diuide them both, therefore by memory onely I turne it into $\frac{9}{10}$, but this ability in knowledge is gotten by exerciſe.

Abbreuiation the third kinde.

Theod. YEt one other way there is; when your fraction hath any Ciphers in the firſt place of both tearmes, then you may by cutting off the Ciphers make a briefe abbreuiation thus, $\frac{4}{7}|\frac{00}{00}$, here you ſée when the 2 Ciphers of either termes are cut awar, the fraction remaining is $\frac{4}{7}$, which is the ſame in value that $\frac{400}{700}$ is; likewiſe if you abbreuiate $\frac{45}{73}|\frac{0}{0}$ it will be $\frac{45}{73}$, the like manner you muſt obſerue in abbreuiating any ſuch fraction.

Iuni. I ſhall ſufficiently remember the methode of this third kind of abbreuiation: I pray you proceed to the other Rules that follow to be wrought in fractions or broken numbers.

Reduction

Reduction the first kind.

Theod. The next Rule that followeth is Reduction in Fractions, of which there are foure parts; the first part sheweth you how to reduce fractions of severall denominations into one denomination, and which of those parts is greatest: as if you would know whether $\frac{2}{3}$ or $\frac{3}{4}$ is greatest, multiply 2 the Numerator of the first fraction into 4 the Denominator of the second, it maketh 8, which you must set ouer the numerator 2 for a new numerator to that fraction, then multiply 3 the numerator of the second fraction into 3 the denominator of the first, it maketh 9, which you must set ouer 3 for a new numerator to your 2 fraction, then you must multiply both your denominators together, and thereof commeth 12 a common denominator to both your new numerators, so you find $\frac{8}{12}$ which you haue for your second fraction to be more then $\frac{9}{12}$, which you haue for your first fraction. Examp.

$$\frac{2}{3}\ \frac{8}{12}\ \frac{3}{4}\ \frac{9}{12}$$

Iuni. Is the same order to be obserued when there are 3 or 4, or more fractions to be reduced?

Theod. If you haue neuer so many fractions to bee reduced, you must multiply the numerator of the first fraction

fraction into the denominator of the ſecond, the totall thereof into the denominator of the third, the totall thereof into all the denominators following, bee there neuer ſo many fractions to be reduced, the number produced muſt be a new numerator to your firſt fraction, & for a new numerator to your ſecond fraction, you muſt multiply the numerator thereof into the denominator of the firſt, the totall thereof into the denominator of the third, and the totall thereof into all the reſt of the denominators following, and ſo conſequently muſt all the reſt bee reduced: loke whoſe numerator you take, you muſt multiply into all the reſt of the denominators, not medling with his owne denominator, the number ſo produced is a new numerator vnto that fraction, and for your common denominator you muſt multiply all your denominators one into the other, be there neuer ſo many, the number produced is a common denominator to all your new numerators.

Iuni. I pray you propound vnto mee one or two examples, and I will worke them according to your direction.

Theod. Reduce theſe fractions $\frac{2}{3}$, $\frac{3}{4}$, $\frac{5}{6}$, $\frac{7}{8}$, into one denomination.

Iuni. For reducing of theſe Fractions, I ſet them thus.

384. 432. 480. 504.

$\frac{2}{3}$ $\frac{3}{4}$ $\frac{5}{6}$ $\frac{7}{8}$

576

Here haue I multiplyed according to your direction, and I finde for $\frac{2}{3}$ the firſt fraction $\frac{384}{576}$, for $\frac{3}{4}$ I find $\frac{432}{576}$, for

for $\frac{5}{6}$ I find $\frac{40}{48}$, and for $\frac{7}{8}$ I find $\frac{105}{120}$, so according to the first vse of this Rule my numerator sheweth me that $\frac{7}{8}$ is more then $\frac{5}{6}$, and $\frac{5}{6}$ is more then $\frac{3}{4}$, and $\frac{3}{4}$ is more then $\frac{2}{3}$, if there be no other vse to made of this Rule, I haue sufficient knowledge in the working of any such question.

Theod. You haue obserued a perfect methode in your worke, but how will you proue whether you haue wrought truely or no.

Iuni. I will set them downe in their common denomination as they are aboue expressed, and then will abbreuiate as you shewed mee in the first kinde of Abbreuiation, for reason giueth mee they are of the same value expressed in their highest tearmes, that they are when they are written in their lowest tearmes, and therefore must returne into their first denominations.

Theod. It sufficeth mee you know the manner of proouing this or any such like question, I referre the worke to be done at your leasure, onely I remember in this first kind of Abbreuiation when you had brought your fractions into their lowest denomination, you were vncertaine of their value, which kind of reducing a fraction is a part of this first kind of reduction, because it is a true fraction, and the first kind of a fraction before intreated of, therefore I will now shew you how to know their values.

Iuni. I pray you proceed as you doe intend, & I giue you hearty thankes for being so carefull in satisfying me in that which I desired to know, I am perswaded the perfect knowledge of a fraction may be greatly to my furtherance hereafter.

Theod.

Theod. To reduce a fraction into his knowne value, as if you would know what the $\frac{7}{8}$ of a pound is, you must multiply the Numerator 7 by 20, because 20 shillings maketh a Pound, that product is 140, which you must diuide by the Denominator 8, you shall find in your quotient 17 Shillings and $\frac{4}{8}$ or $\frac{1}{2}$ of a shilling remaining which is 6 d. so that $\frac{7}{8}$ of a Pound is found to be 17 s. 6 d.

Iuni. I will if you please propose one example, and worke it my selfe; it shall bee thus, what is the $\frac{5}{12}$ of a shilling? I multiply the numerator 5 by 12, because 12 d. maketh a shilling, and diuide that product by the denominator 8, the number produced in the quotient is 7 d. and $\frac{4}{8}$ of a penny remaining, which beeing abbreuied is $\frac{1}{2}$ d. so that I take the $\frac{5}{12}$ of a shilling in value to be 7 d. halfe penny. I doubt not but that I am perfect inough in the seeking out of y value of any fraction in Coyne, but is the same manner obserued in setting the value of a fraction in Waight and Measure.

Theod. The same methode is obserued in waight and measure, but you shall doe well to worke one example for you better satisfaction.

Iuni. I thanke you sir for your good aduise, I will make tryall according to my slender knowledge, and the question shall bee thus. What is the $\frac{7}{9}$ of a pound waight, I first consider how many ounces maketh a pound which is 16, then I multiply 16 by the numerator 7, & diuide that product by 9, the number produced in the quotient is 12 ounces & $\frac{4}{9}$ of an ounce remaining: because there is yet a lower Denomination which is quarters of ounces, I multiply the numerator 4 by 4, because 4 quarters maketh an ounce, that product being

ing

ing 16, I diuide by 7, the number produced in the quotient is 1 quarter of an ounce, and $\frac{2}{7}$ of a quarter remaining, so that $\frac{7}{9}$ of a pound waight is found to be 12 ounces, $\frac{1}{4}$ and $\frac{2}{7}$ of $\frac{1}{4}$ which is 12 ounces, $\frac{1}{2}$ wanting but the $\frac{1}{7}$ of a quarter of an ounce, for I remember you told me in a fraction when the numerator is equall to the denominator it is a whole thing signified, therfore doth the fraction remaining want $\frac{1}{7}$ of a quarter of an ounce: I could haue brought that fraction into a lower denomination or parts of a quarter of an ounce, which is Drammes, but I consider his value as well in that part he now standeth, as if it were brought into a lower denomination. And this I obserue for a generall rule, whatsoeuer any fraction that I desire to know his value is a part of, I must put that whole thing into his next denomination, as if the fraction be parts of a pound, I put one whole pound into shillings, and multiply the number of shillings that are in a pound by the numerator, and diuide by the denominator, my quotient giueth me shillings, and I proceed vnto the next denomination which is pence, and so may continue vnto the lowest denomination, vntill I haue found the least value that may be, yet in some fractions I see there will still be a remainer, whose value I can gesse as neere as it may be taken, therfore I pray you proceed vnto the second kind of Reduction, and so to the rest of the Rules in Fractions, for I find those few rules I haue already learned (which before I entred into them, seemed to me very obscure) now very easie, and so commodious, that I desire very earnestly to attaine the rest that followeth.

The

The ſecond kind of Reduction.

Theod. The ſecond kinde of Reduction ſheweth you how to worke the parts of parts, or fractions of fractions, as if you would know what the $\frac{2}{3}$ of $\frac{3}{4}$ of a pound is, or what the $\frac{1}{2}$ of $\frac{1}{3}$ of $\frac{3}{4}$ of $\frac{1}{5}$ of a ſhilling, or what the $\frac{1}{7}$ of $\frac{7}{8}$ of a pound waight, to ſatisfie your deſire in any queſtion that ſhall be ſo propounded, you muſt onely multiply all your denominators together, the number produced muſt be your denominator, then you muſt multiply all your numerators together, the number produced is your numerator that anſwereth to your demaund.

Iuni. I pray you giue me leaue to worke onely one of thoſe three queſtions which you haue here propounded, which I truſt will be ſufficient for my inſtruction in this rule. To proſecute my worke, I beginne with the firſt Queſtion thus, ſaying, what is the $\frac{2}{3}$ of $\frac{3}{4}$, I finde $\frac{6}{12}$ or $\frac{1}{2}$, be it of a pound, ſhilling, peny, pound waight, or any denomination, Coyne, waight, or meaſure, the $\frac{1}{7}$ of $\frac{1}{2}$ I take to be $\frac{1}{14}$, I prowe it by the parts of a pound, which is eaſieſt to my vnderſtanding, ſaying, $\frac{1}{2}$ of a pound is 15 ſhillings, then the $\frac{1}{5}$ of $\frac{1}{2}$ muſt needes be 10 ſhillings, for $\frac{1}{7}$ of 15 ſhillings is 5 ſhillings, and $\frac{1}{7}$ is 10 ſhillings, then I value my fractions that anſwere vnto the Queſtion which is $\frac{1}{14}$, and $\frac{2}{3}$ is 10 ſhillings agreeable to $\frac{2}{7}$ of $\frac{1}{2}$, therefore I may take it for a generall rule, hauing multiplyed both numerators and denominators according as you haue ſhewed me, the fraction that commeth of thoſe multiplications

anſwereth to the queſtion.

Theod. I will trouble you no further with this Rule, it ſéemeth to you very eaſie, and you ſhall find it héereafter very profitable, and I doubt not but this will be ſufficient for your inſtruction therein. I will now proceéd to the third kind of Reduction, which is to ſhew you, how you muſt expreſſe whole and parts of whole, in a fraction.

Iuni. I pray you proceéd, for I greatly deſire to haue the perfect knowledge of Fractions.

The third kind of Reduction.

Theod. TO put whole and parts of a whole into a fraction, you muſt conſider what parts of a whole your inferiour denominations are, & into ſuch parts are the whole to be reduced; example, if I would haue 7 li. 15 s. expreſſed in a fraction, you muſt firſt conſider what part of a pound 15 s. is, which is $\frac{1}{4}$, into ſuch parts muſt 7 li. 15 s. be reduced: to put 7 li into ſuch parts, you are but to ſéeke that 4 parts maketh 1 whole, then multiply 7 by 4 & it maketh $\frac{28}{4}$ for 7 li. then adde thereunto 3 for your $\frac{1}{4}$ which is 15 s. and 7 li. 15 s. is expreſſed in a fraction thus $\frac{31}{4}$.

Iuni. I pray you giue mee leaue to worke one example, which ſhall be thus, I would haue 9 li. 12 s. 6. d. expreſſed after the manner of a fraction; to reſolue my queſtion, I put 12 s. 6 d. the inferiour denominations into the parts of a pound which is $\frac{1}{20}$ of a pound,

I

I multiply 9 li. by my denominator 8, and adde thereunto 5 my numerator, which maketh 77, so that 9 li. 12 shillings, 6 d. is expressed in manner of a fraction thus, $\frac{77}{8}$.

Theod. What, say you it is expressed in manner of a fraction, and not in a fraction.

Iuni. I know it cannot expressly be said to bee a fraction, because it doth consist both of whole and part of a whole, and no number expressed can properly bee sayd to be a fraction, if it containe fully one whole thing, for when the numerator doth exceed the denominator, that cannot bee sayd to bee a Fraction, because one whole thing cannot bee diuided into so many parts as the numerator doth expresse when it is greater then the denominator.

Theod. Such quantities so expressed cannot indeed propperly bee tearmed a Fraction, but you shall often times haue occasion in many workes to expresse such quantities as you expresse a Fraction, and therefore they are tearmed improper fractions, and therefore is it said, that this is the third kind of Reduction, whose vse is to reduce whole and parts of whole into a fraction, or so to reduce any such quantity, as to expresse thē as also a fraction is expressed: a fourth kind of Reduction is thereby knowen which is to reduce an improper fraction into his knowne value, and these rules proue each other.

Iuni. I partly vnderstand the vse of this Rule already, if you will giue mee leaue I will try my wits by the 2 questions wrought by the Third kind of Reduction.

Theod. I am very glad so little instruction satisfi-

eth your vnderſtanding, proceed therefore to the fourth kind of Reduction.

The fourth kind of Reduction.

Iuni. IN the Third kind of Reduction which I laſt learned, the vſe of that rule is to expreſſe whole and parts of whole in manner of a Fraction, and this fourth kind being a proofe of the third muſt reduce ſuch fractions ſo expreſſed into their knowen values or former denominations: againe, as by the examples 7 li. 15 s. and 9 li. 12 s. 6 d. being expreſſed in maner of a fraction may appeare, for 7 li. 15 s. expreſſed in manner of a fraction is ſaid to be $\frac{1}{4}$, and 9 li 12 s. 6 d. ſo expreſſed is ſaid to be $\frac{7}{8}$, to returne them into their former denominations againe, I diuide 31 by 4, and my quotient giueth mee 7 li. and $\frac{3}{4}$ which is 15 s. remayning, ſo that $\frac{1}{4}$ li. and 7 li. 15 s. is all of one value, and 77 being diuided by 8, my quotient giueth mee 9 li. and $\frac{5}{8}$ of a pound remaining, which is 12 ſhil. 6 d. and ſo is $\frac{77}{8}$ and 9 li. 12 s. 6 d. both of one value, and I further perceiue that the third kind of Reduction is the proofe of this fourth kind, as the fourth kind is a proofe of the third kind.

Theod. But why haue you diuided your Numerators by your Denominators.

Iuni. Becauſe I know when the Numerator doth equall the denominator, and is neither more nor leſſe, it is a whole thing, and therefore I conſider as often as the numerator doth containe the denominator, ſo many whole are expreſſed in that fraction, and the remainer

mainor is ſo many parts of a whole as are expreſſed by the denominator.

Theod. I am perſwaded you haue good experience in the knowledge of a Fraction: hauing now finiſhed thoſe foure kinds of Reduction, wee will proceede to the reſt of the foure principall parts which are in fractions, as they are in whole numbers, to wit, Addition, Subſtraction, Multiplication, and Diuiſion.

Iuni. I pray you proceed, I greatly deſire to attaine the methode of thoſe Rules.

Addition in Fractions.

Theod. ADdition, is the firſt to be learned, and for the adding of Fractions together, bee they more or leſſe that are to bee added, you muſt firſt reduce them into one Denomination, and then adde all their Numerators together, if they make more then one whole, you muſt diuide the Numerator produced, when the Numerators are added together by the Denominator, the quotient ſheweth you how many whole you may find, if they make not a whole, you may ſeeke their certaine values eyther by abbreuiating you Fraction, or by reducing your

fraction, as you were shewed in the first kinde of Reduction, as this example sheweth:



$\frac{2}{3}$ and $\frac{3}{4}$ being to be added together, they are first reduced into one denomination, for $\frac{2}{3}$ I find $\frac{8}{12}$, for $\frac{3}{4}$ I find $\frac{9}{12}$, the two numerators being added maketh $\frac{17}{12}$, which is more then a whole 17, being divided by 12 it maketh 1 whole and $\frac{5}{12}$ of a whole, and so much is your 2 fractions being added together.

Iuni. I very well understand the manner of Addition, as you shall well perceive by two questions which I will propose and answere, the first example is thus: I would have $\frac{2}{7}$ and $\frac{1}{3}$ added together, these 2 fractions must be first reduced into one denomination, and then their numerators added, the summe thereof produced is $\frac{13}{21}$, if I would know their iust values, I must reduce them as I was shewed in the first kinde of Reduction: I omit the worke, and satisfie my selfe with that I have, knowing that I can seeke out the certaine value at my leasure; and now to the second example, I would



have $\frac{48}{72}$ $\frac{54}{72}$ and $\frac{60}{72}$ added together.

First I reduce the Fractions into one denomination, where for $\frac{2}{3}$ I find $\frac{48}{72}$, for $\frac{3}{4}$ I find $\frac{54}{72}$, for $\frac{5}{6}$ I finde $\frac{60}{72}$, whose numerators being added together maketh $\frac{162}{72}$, which is whole & parts of a whole, 162 being divided

uided by 72 maketh 2 whole, and $\frac{18}{72}$, or 2 $\frac{1}{4}$, and this I hope may bee ſufficient for my inſtruction in this Rule.

Subſtraction in Fractions.

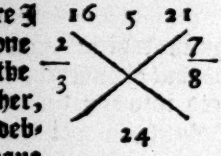
Theod. YOu haue well done, and I perceiue you haue the perfect vnderſtanding of Addition: wee will now therefore procéede to the next Rule which is Subſtraction, which Rule is contrary vnto Addition, you ſhall neuer ſubſtract but one fraction out of another, or 2 fractions that are to bee reduced into one denomination out of one fraction, and whenſoeuer you haue 2 fractions of contrary denomination to be ſubſtracted one out of the other, you muſt firſt reduce them into one denomination, and then ſubſtract the one Numerator out of the other, and ſo is your worke finiſhed: if you would ſubſtract two ſeuerall denominations out of one fraction, you muſt firſt reduce your two ſeuerall denominations into one denomination, and then you muſt reduce that fraction produced with the Fraction, out of which you muſt ſubſtract him into one denomination, and ſo ſubſtract one Numerator out of the other, then is your worke finiſhed.

Iuni. I pray you giue mee leaue to propound an example or two, and anſwere them my ſelfe, for I perceiue there is little difficulty in theſe Rules more then I haue learned in Reduction.

Theod. You are very apt and forward in propoſing

examples, and I commend your diligence greatly in that you presume vpon your owne abilitie in answering such questions, as you doe propose, before you see any example wrought for your instruction, therefore proceed as you intend.

Iuni. I will doe my best endeauour God willing, if I be doubtfull in any thing I wil intreate your furtherance, the first example proposed shal be thus, I did owe vnto my friend M: C: $\frac{2}{3}$ of a pound of money, and haue paid vnto him $\frac{7}{8}$ of a pound, I would know what I rest indebted, here I haue reduced the 2 fractions into one denomination: and substracted the 2 Numerators one out of the other, and I find my selfe to remaine indebted $\frac{5}{24}$ of a Pound, I thinke I haue wrought truely.



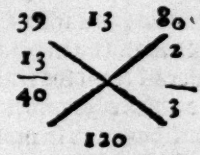
Theod. Your diligence I cannot but commend, therefore proceed vnto the nert question which you entend to propose.

Iuni. I sould vnto H: W: 3 yardes of Fustian for $\frac{3}{4}$ of a pound, I was paid thereof at one time $\frac{1}{8}$ of a Pound, at another time $\frac{1}{5}$ of a pound. I would know what I haue yet to receiue; I haue reduced both payments into on denominatiõ, and added them together, the fraction produced is $\frac{13}{40}$, which I reduce into one Denomination

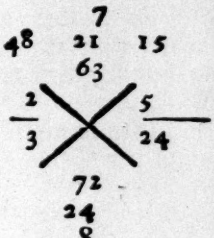


with

with $\frac{1}{3}$ the principall debt, and ſubſtract the numerators, the remaines is $\frac{41}{120}$, as the example ſheweth;



If there bee no more difficulty in Subſtraction of Fractions, I hope your directions hath béne ſufficient for my inſtruction, and for proofe of this Rule, I haue heard you often ſay that the one rule proueth the other, Addition proueth Subſtraction, and Subſtraction proueth Addition, but for the better ſatisfying of my ſelfe I will (by your patience) proue the firſt example wrought in Subſtraction by Addition, whether $\frac{2}{3}$ that is ſubſtracted and $\frac{1}{24}$ remaining, being added together will make $\frac{7}{8}$ the due debt, héere haue I proued Subſtraction by Addition, the ſame worke in Subſtraction now proued by Addition proueth this Addition, therefore this may ſuffice for the proofe of theſe Rules: I pray you proceéde to the next Rule which I take it by the order that followeth in whole numbers is Multiplication.



Multiplication in broken numbers.

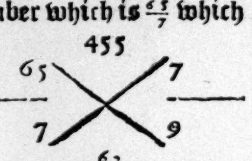
I will ſatisfie your deſire, and becauſe you ſhall apply your wits the better to the vnderſtanding of this Rule. I giue you to vnderſtand that ſome time there bee

be whole Numbers to be multiplyed with fractions. And many be in two ſorts, either the whole number is ſeuerall from the fraction and is the multiplyer, or elſe the whole Number is ioyned with one or both the fractions, and ſo maketh a iuſt number thereof; if it be in the firſt ſort, then needeth there no Reduction, but onely multiply the numerator of the fraction by that whole number, and the totall thereof ſet for a Numerator.

Iuni. I vnderſtand you thus, if I haue $\frac{3}{7}$ to be multiplyed by 7, then muſt I multiply that 7 with 3 which is the numerator, whereof commeth 21, keeping ſtill 5 for my denominator, and ſo the fraction produced wil be $\frac{21}{7}$ that is $4\frac{1}{7}$.

Theod. For the other ſort, where the number is mixt, firſt reduce the whole number and fraction into an improper fraction, and then multiply them together as if they were meere fractions.

Iuni. I propoſe an example thus, $9\frac{7}{9}$ is to be multiplied by $\frac{7}{5}$, I reduce the mixt number which is $\frac{65}{7}$ which I multiply with $\frac{7}{9}$, example; the fraction produced is $\frac{455}{63}$, or $7\frac{14}{63}$, or the fraction abbreuied $7\frac{7}{9}$.



Theod. Now for the multiplying of thoſe which are meerely fractions, worke an example or 2 although there be leſſe difficulty then in the working of mixt numbers.

Iuni. I will propoſe one example thus, $\frac{3}{4}$ to bee multiplied

multiplyed with $\frac{2}{7}$ the nũber heere produced is $\frac{6}{12}$ or $\frac{1}{2}$ being abbreuiated.



Theod. You haue done well, and ſo may you ſée that although thoſe that are méerly fractions or a whole number with a fraction may be wrought without reduction, yet mixed numbers cannot be multiplyed before they be reduced, and I ſhall not néed to tell you that multiplication is proued by Diuiſion, and diuiſion likewiſe by multiplication, but the like workes that are ſhewed you in multiplication, I will ſhew you in diuiſion alſo, then proue them at leaſure.

Iuni. I pray you proceéd as you intend, for I greatly deſire to goe forward.

Diuiſion.

Theod. When thoſe that are méerely fractions are to be diuided, you muſt multiply ỹ numerator of the fraction next your left hand, which is taken for diuiſor, into the denominator of the fraction next your right hand which is taken for dividend, ỹ number produced is the denominator to your new fraction, then multiply the numerator of your fraction next your right hand, into the denominator of the firſt next your left hand, the number produced is the numerator to your new fraction; if you diuide a whole number by a fraction, you muſt ſet them downe thus, $\frac{7}{1}, \frac{2}{3},$ & worke as before is ſhewed, but if you would diuide the fraction by the whole number, you muſt ſet them downe thus, $\frac{2}{3}, \frac{7}{1}$.

Iuni.

Iuni. I pray you giue mee leaue to worke an example euery way according to your direction, and firſt I will begin with thoſe that are meerely Fractions, $\frac{2}{3}$ to bee diuided by $\frac{1}{4}$, I ſet my fractions thus, $\frac{2}{3}$, $\frac{1}{4}$, which diuided, the number produced is $\frac{8}{3}$, then to diuide a whole number by a fraction, I take the ſame fraction and whole number your ſelfe propoſed, $\frac{7}{1}$, $\frac{3}{7}$, $\frac{3}{21}$, the number produced is $\frac{3}{21}$, to diuide a fraction by a whole number as $\frac{3}{7}$, $\frac{7}{1}$, $\frac{3}{7}$, the fraction produced is $\frac{1}{3}$.

Theod. You conceaue it well, onely this note, I giue you for a remembrance, if there be any mixt numbers to be diuided either one or both, you muſt firſt reduce that mixt number into an improper fraction, and worke as you haue learned.

Iuni. That was ſufficiently taught in Multiplication, therefore I pray you goe forward, I truſt I am ſufficiently inſtructed in the knowledge of all the principall parts of fractions, therefore doe I deſire to make vſe of this knowledge in working the Rule of 3, which you haue already taught me in whole numbers.

The Golden Rule.

Theod. As touching the Golden Rule, or Rule of 3 direct, if your three numbers bee fractions, you muſt multiply the numerator of the firſt fraction next your left hand into the Denominator of the ſecond, the totall thereof into the Denominator of the third, the number ſo produced ſhall bee your diuiſor, then multiply the numerator of your third fraction into the

the numerator of the ſecond, the totall thereof into the denomination of the firſt, the number ſo produced ſhall bee your dividend: now if the dividend you ſhall find be greater then the deuiſor, you muſt diuide them, the quotient will giue you the number that anſwereth to the queſtion, if the dividend be leſſe then the diuiſor you muſt abbreuiate, example, if $\frac{3}{4}$ of a yarde of Carſie coſt $\frac{5}{16}$ of a pound of Money, what ſhall $\frac{5}{6}$ of a yarde coſt?

Iuni. If it pleaſe you I may make the anſwere, I will firſt place theſe three fractions (as I learned in whole numbers (thus $\frac{3}{4}—\frac{5}{16}—\frac{5}{6}$. Now according to your direction, I multiply 2 the Numerator of the firſt fraction by 16 the denominator of the ſecond, the totall thereof into the denominator of the third, the number produced is 192 which is my deuiſor, then I multiply 5 the numerator of the third fraction, into 5 the numerator of the ſecond, the totall thereof into the denominator of the firſt, the number ſo produced is 75, which numerator & denominator ſo produced maketh $\frac{75}{192}$, or $\frac{25}{64}$.

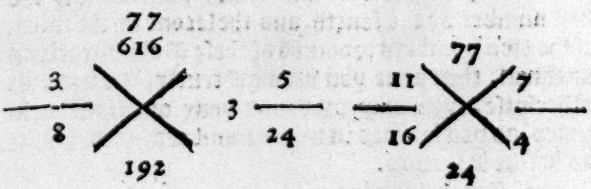
Theod. For proofe of this Rule, you multiply the firſt number by the fourth, and the ſecond by the third, if the two numbers produced of theſe Multiplications be equall, then haue you wrought truely, elſe not: or otherwiſe, you may propound your queſtion backward, as you learned in whole numbers, and worke as before is ſhewed.

Iuni. I pray you giue me leaue to propoſe one other queſtion and anſwer it my ſelfe, I deſire to bee perfect in this rule, becauſe I perceiue it will ſhorten the manner of worke in whole numbers.

Theod.

Theod. If your queſtion propounded either of the three numbers doth conſiſt in whole & parts of whole; and that you can put any ſuch number into a fraction, it muſt néeds be a more compendious methode then you doe vſe in whole numbers.

Iuni. I will not boaſt of my ſkill, but for the triall of my wit and your better aſſurance of my ability, for the working of any queſtion in fractions, according to the order of this Rule; the queſtion I will propoſe ſhall be thus, If $\frac{1}{8}$ of a pound of Siluer coſt 13 ſhillings 9 pence, what ſhall 1 pound $\frac{3}{4}$ coſt, I firſt conſider what part of a pound 13 ſhillings 9 pence is, which is $\frac{11}{16}$, then I put 1 $\frac{3}{4}$ into an improper fraction which is $\frac{7}{4}$, then doe I ſet my three numbers thus, $\frac{1}{8} \times \frac{11}{16} \times \frac{7}{4}$, then doe I multiply as before is ſhewed, and find $\frac{616}{192}$, which being divided giueth me 3 pound $\frac{5}{24}$, or 3 li. 4 ſhillings 2 pence; for proofe I multiply the firſt and fourth numbers together, & the ſecond and third numbers together, thus;



The

The numbers produced are $\frac{77}{84}$, as by the examples appeareth, I could haue put the second number into the parts of a shilling, but that I iudge it to bee wrought more compendiously this way, and for proofe by propounding the question backward, experience teacheth mee it may so bee done by the former practise I haue had in whole numbers.

Rules of Practise.

Theod. I Cannot but still commend your diligence, I will now giue you a short instruction of Practise, shewing the euen parts of a Pound or Shilling.

of a li.	of a li.	of a s.
10 s. is the $\frac{1}{2}$.	10 d. is $\frac{1}{24}$.	6 d. is the $\frac{1}{2}$.
6 s. 8 d. is the $\frac{1}{3}$.	8 d. is $\frac{1}{30}$.	4 d. is the $\frac{1}{3}$.
5 s. is the $\frac{1}{4}$.	6 d. is $\frac{1}{40}$.	3 d. is the $\frac{1}{4}$.
4 s. is the $\frac{1}{5}$.	5 d. is $\frac{1}{48}$.	2 d. is the $\frac{1}{6}$.
3 s. 4 d. is the $\frac{1}{6}$.	4 d. is $\frac{1}{60}$.	3 ob. is the $\frac{1}{8}$.
2 s. 6 d. is the $\frac{1}{8}$.	3 d. is $\frac{1}{80}$.	1 d. is the $\frac{1}{12}$.
2 s. is the $\frac{1}{10}$.	2 d. is $\frac{1}{120}$.	3 farthing. $\frac{1}{16}$.
20 d. is the $\frac{1}{12}$.	1 d. is $\frac{1}{240}$.	$\frac{1}{2}$ penny $\frac{1}{120}$.
16 d. is the $\frac{1}{15}$.		1 farthing $\frac{1}{480}$.
15 d. is the $\frac{1}{16}$.		
12 d. is the $\frac{1}{20}$.		

In which Table, you see what parts of a Pound or Shilling you may take to find out your demand, as if the valued price of a yard be 2 shillings 6 pence, which is

is $\frac{1}{7}$ of a pound, if by that valued price you would know what 795 yards at that rate are worth, you must take the $\frac{1}{7}$ of that quantity, and it will shew you what is the iust valued price of so many yards; example.

At 2 s. 6 d. the yard, what

795			
99	7	6	

Iuni. I perceiue the $\frac{1}{7}$ of 79 is 9, and there remaineth 7, which 7 being in the second place maketh the 5 in the first place 75, so the $\frac{1}{7}$ of 75 is 9, so that the valued price of 795 yards is 99 pounds, and $\frac{1}{7}$ of a pound remaining, the $\frac{1}{7}$ being 2 shillings 6 pence, $\frac{1}{7}$ must néeds be 7 shillings 6 pence; for proofe of this, I perceiue I néed no further worke then to multiply the whole quantity of yards by 2 shillings, and take the $\frac{1}{2}$ thereof for 6 pence, and adde them both together, and conuert those shillings into pounds, and it giueth mee the iust valued price; Example, at 2 shillings 6 d. what

795			
1570			
397		6	
198	7	6	
997		6	

Now, if you please to giue me some other examples, I will worke them my selfe.

Theod. I will giue you onely 6 examples, which will bee sufficient for your instruction to worke any such like question, when the giuen price is the euen part of a shilling, and for proouing those or any such like

like I will giue you instruction hereafter.

At 6 d. what 329 yards?	At 2 d. what 987 li.
164 6	164 6
8 4 6	8 4 6
At 4 d. what 795 yards?	At 1 d. what 795 elles?
265 0	66 3
13 5 0	3 6 3
At 3 d. what 8795 yards?	At ¼ d. what 876 yards?
2198 9	54 9
109 18 9	2 14 9

Iunii. I haue wrought those questions you haue proposed according to the euen parts, the giuen prises doth beare vnto shilling, and then haue reduced my shillings into pounds, the proofe I desire, because you haue promised to shew it me hereafter, but if the giuen prise happen to be such, as it is no euen part of a shilling, how shall I then worke according to this rule.

Theod. If your giuen prize be odde numbers as 5 d. 7 d. 9 d. 11 d. or such like, you must first worke for so much thereof as maketh an euen part, or put the odde parts into euen parts thus, if the giuen price be 5 d. you must consider that 3 d. is ½ of a shilling, and 2 d. is ⅙, & so take these 2 parts of the whole quantity of goods and adde them together, that product answereth to your question, for your better vnderstanding I will set you downe 2 examples.

At 5 d. ꝙ yard, what 8975 yards?

½		2243	9
⅓		1495	10
		3739	7
		186	19 7

At 7 d. ꝙ pound, what 9873 Pou.

⅓		3291	
¼		2468	3
		5759	3
		278	19 3

Iuni. I perceiue your manner of worke very well, and I thinke I could worke them another way according to this rule, if you please too giue me leaue I will trie my skill. Firſt I ſet the queſtions downe as you haue ſhewed me thus;

At 5 d. ꝙ yard, what 8975 yards?

⅓		2991	8
1/12		747	11
		3739	7
		186	19 7

At 7 d. ꝙ pound, what 9873 Pou.

⅔		4936	6
1/12		822	9
		5759	3
		287	19 3

Theod.

Theod. You haue well done, and as you goe forward in this rule you ſhall vnderſtand that you need no other proofe vnto any queſtion, but by ſome variety of working according to the ſame rule.

Iuni. I pray you (for my better inſtruction when the giuen price is an odde number) giue me leaue to worke two queſtions, and proue them according to the ſame rule, they ſhall be thus.

At 9 d. what 8795 yards?

1/2	3497	6	
1/4	2198	9	
	6596	3	
	329	16	3

At 9 d. what 8795 yards?

1/3	2931	8	
1/12	2918	9	
1/6	1465	10	
	659	6	2
	329	16	3

At 11 d. what 8776 yards?

1/2	4388		
1/3	2925	4	
1/12	731	4	
	8044	8	
	402	4	8

At 11 d. what 8776 yards?

1/3	2925	4	
1/3	2925	4	
1/4	2194	0	
	8044	8	
	402	4	8

Theod. You haue made very good diuiſions both for worke and proofe, I will now goe forwards when the giuen price ſhall be the euen parts of a pound, which are to be wrought as the euen parts of a ſhilling, I will onely propound theſe queſtions.

At 10 s. what 8795 yards?

½	4397	10	0

At 6 s. 8 d. what 795 yards?

⅓	265	0	0

At 5 s. what 9763 yards?

¼	2440	15	0

At 4 s. what 8795 yards?

⅕	1759	0	0

At 3 s. 4 d. what 753 yards?

⅙	125	10	0

At 6 s. 8 d. what 795 yards?

⅓	265	0	0

At 5 s. what 9763 yards?

½	1220	7	6
½	1220	7	6
	2440	15	0

At

At 4 ſ. what 3795 yards?

1/10	879	10	0
1/10	879	10	0
	1759	0	0

At 3 ſ. 4 d. what 753 yards?

1/12	62	15	0
1/12	62	15	0
	125	10	0

Iuni. I am ſure I haue wrought truely theſe queſtions you laſt propounded to the euen parts of a pound, and the Rule is ſo delightſome that I greatly deſire to haue the full vſe thereof; therefore I pray you proceed to the vneuen parts of a pound, which I gueſſe ſhould next follow.

Theod. I will ſatisfie your deſire, and am very glad I haue in you ſo apt a Scholler, the method that is to be obſerued in theſe euen parts of a pound, is the ſame that you obſerued in the vneuen parts of a ſhilling, therefore I will onely propound vnto you ſeuerall examples, to be wrought and proued by you, if you reſt doubtfull of any of them; I will reſolue you, only take this memorandum, that in theſe three former examples, where as you haue made two workes in each of them, you might as well haue done them at once, viz. for 2 1/10, for two tenths 1/5, and for two twelue 1/6.

Iuni. I pray you let it be done as you intend, and I hope I ſhall ſufficiently ſatisfie your expectation therein.

Theod. The queſtions are as followeth.

At 3 s. the yard, what 875 yards?

1/10	87	10	
1/20	43	15	
	131	5	0

At 6 s. what 9873 yards?

1/4	2468	5	
1/20	493	13	
	2961	18	0

At 3 s. what 875 yards?

1/12	72	18	4
1/12	58	6	8
	131	5	0

At 6 s. what 9873 yards?

1/5	1974	6	
1/10	987	6	0
	2961	18	0

At 9 s. what 8753 yards?

1/4	2188	5	0
1/5	1750	12	0
	3938	17	0

At

At 11 s. what 7965 yards?

½	3982	10	
1/10	398	5	0
	4380	15	0

At 16 s. what 9675 yards?

½	4837	10	
¼	2418	15	0
1/10	843	15	0
	7739	10	0

At 19 s. what 8753 yards?

½	4376	10	
¼	2188	5	
1/20	1750	12	0
	8315	7	0

At 7 s. what 6573 yards?

¼	1314	12	
1/20	657	6	0
1/20	328	13	0
	2300	11	0

At 9 s. what 12875 yards?

¼	3214	0	
1/5	2571	4	0
	5785	4	0

At 11 s. what 7965 yards?

1/2	2655		
1/6	1337	10	
1/10	398	5	0
	4380	15	0

At 16 s. what 9657 yards?

1/2	4828	10	
1/5	1931	8	
1/10	965	14	0
	7725	12	0

At 19 s. what 8753 yards?

1/3	2917	13	4
1/4	2917	13	4
1/12	729	8	4
1/5	1750	12	0
	8315	7	0

Iuni. If you finde that I haue orderly wrought and proued theſe queſtions according to the method of this Rule, I pray goe forward.

Theod. You haue ſufficiently ſatisfied my expectation, I intend now (God willing) to ſhew a more compendious method, when the euen price is pence, and ỹ euen parts of a pound, to bring them into pounds in one worke, and the manner is thus, there are in a pound 240 pence, in conſideration whereof, cut off the cipher and there remaineth 24, of the which 24, 8 pence is the 1/3, 6 pence the 1/4, 4 pence the 1/6 part, 3 pence the 1/8 part, 2 pence is the 1/12 part, to try your wits whether you

you can comprehend this method, I propoſe 2 or 3 examples thus, and wiſh you to proue your workes to the parts of a ſhilling, as you haue learned.

At 6 d. what 8795 yards?

219 17 6

At 8 d. what 8797 yards?

293 4 8

At 4 d. what 9765 yards?

162 15 0

At 8 s. what 8797 yards?

1759 8
1759 8
3518 16

At 4 d. what 9765 yards?

5325 0
162 15 0

Iun. I was for a time doubtfull what the rematners in theſe workes ſhould bee, but at length I conſidered the parts that I toke was of a pound, therefore I eſteemed the remainer to be ſo many of theſe parts

of

of a pound that my worke did conſiſt of as in the firſt example, there remained 35 which I toke to be 35 6 ounces, or the $\frac{35}{40}$ of a pound which is 17 ſhillings 6 pence, and finding the proofe by the parts of a ſhilling to agrée therewith, I was aſſured I had wrought truely.

Theod. You haue well done, and this Rule thus obſerued will bring you to the eaſier abbreuiating of your parts of pence, although to ſome it will not ſéeme ſo eaſie, but there is nothing that practiſe and experience doth not bring to paſſe, I will now proceed vnto the proportionall Rules, and firſt I will ſhew you ſome queſtions in the Rule of 3 whirh you already learned, according to ỹ methode of that rule now to be wrought by practiſe.

Diuers queſtions of the Rule of 3.

Theod. IF a Ryall of Plate be worth 6 pence, & you tell 40 Ryals for a pound, how many Ryals muſt you haue in 1000 ponnd?

li.	Ryall.	li.
1	40	1000
		40
		0000
		4000
		40000
Iuni. I anſwere.		40000

Theod.

Theod. If a Phillips Dollor be worth 4 ſ. 8 d. how much money is 465342 Dollors.

	Dol.	ſ.	d.
If	1	4	8
		12	
		48	
		8	
		56	

Dol.
465342
56
2792052
2326710
26059152

				x				
		x	x	x	x			
		2	8	x	7	7	7	
2	6	0	5	9	x	5	2	2171596
x	x	x	x	x	x	x	x	108579 16 0
	x	x	x	x	x	x		

Iuni. I anſwere. 108579 li. 16 ſ. 0 d.

Theod. If I deliuer Angels here at 10 ſhillings the peece to be payd 10 ſhillings 2 pence the peece in Flaunders for each Angell, how much muſt I receiue for 1654 pound of Engliſh money, after the rate.

	li.
	1654
	2
Angell.	3308

3308			
	10 ſ.	2 d.	
1654	0	0	
27	11	4	
1681	11	4	

Iuni.

Iuni. I anſwere 1654 li. at 10 ſ. 2 d. the Angell, are worth 1681 li. 11 ſ. 4 d.

Theod. If I receiue 8060 French Crownes at 6 ſ. 1 d. the peece in France, how much Engliſh money muſt I pay here at 6 ſ. 4 d. the peece.

8060	ſ.	d.
	6	1
2015		
403		
33	11	8
2451	11	8

Iuni. I anſwere 8060 French Crownes at 6 ſ. 1 d. the Crowne, are worth 2451 li. 11. ſ. 8 d.

Theod. If I buy 1965 yards of Cloth at 16 ſ. the yard, what ſhall I gaine in the whole ſumme to ſell it at 17 ſ. 3 d. the yard?

1965	yards.
16	ſ.
982	10
491	5
98	5
1572	0

1965	yards.		
17 ſ.	3 d.		
982	10		
491			
196	10		
24	11	3	
1694	16	3	

1694	16	3
1572	0	0
122	16	3

gained.

Iuni. I anſwere, there is gained in 1965 yards of Cloth which coſt 16 ſhillings the yard, and is ſold for 17 ſhillings 3 pence, the iuſt ſumme of 122 pounds 16 ſhillings 3 pence.

Theod.

Theod. If I buye 837 yards of linnen Cloth at 16 d. the yard, how muſt I ſell the ſame to gaine 20 li. in the whole 837 yards?

yards.	li. ſ. d.	li.
837	55 16 0	75 16
16 d.	20	20
41 17 0	75 16 0	1516
13 19 0		12
55 16 0	6	3032
		1516
		18192

18192
837
6732
5355
4185
2511
837
83

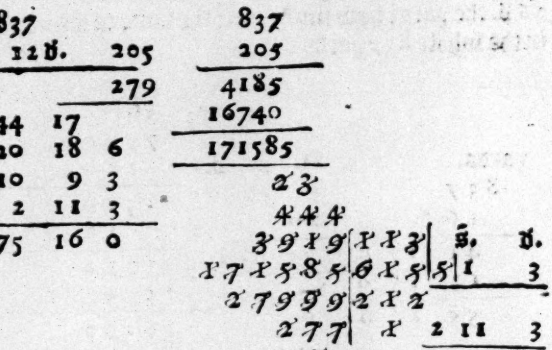
d. 205
615
21 837 of a peny.
279

Iunii. I anſwere 837 yards at 16 pence the yard will coſt 55 li. 16 ſhillings, I adde thereunto 20 li. which muſt be the gaine, then doe I reduce 75 li. 16 ſ. which is both principall and gaine into pence, and I finde that one yard is ſold for 21 $\frac{205}{279}$ of a penie, but if it pleaſe you to giue mee leaue although the reſt of the former queſtions propoſed and wrought according to this rule by practiſe, ſéemeth ſo eaſie that they néed no further proofe then to peruſe them ouer againe with my eye, yet becauſe this queſtion ſéemeth more difficult, I will proue whether I haue wrought truely or not, ſaying thus, at 21 d. $\frac{205}{279}$ of a peny, what ſhall 837 yards bée worth.

837

837			
12 d.			205
			279
44	17		
20	18	6	
10	9	3	
2	11	3	
75	16	0	

837
205
4185
16740
171585



li.	s.	d.
75	16	0
2	11	3

Hereby the rate of 12 d. $\frac{205}{279}$ of a peny the yard, I find 837 yards are worth 75 li. 16 s. which is the iuſt valued price both with principall and gaine, therefore haue I wrought truely.

Theod. You haue well done, and very compendiouſly effected your worke, but I marualle how you ſhould worke your fraction ſo readily and perfectly, being that you were neuer yet ſhewed how to worke any ſuch like queſtion.

Iuni. I did thus conſider when I had wrought for the whole quantity of pence that I once learned, when the numerator of any fraction was equall to the denominator, it did ſignifie a whole thing, therefore multiplying the numerator by the whole quantity of yards, and diuing that product by the denominator, the quotient muſt néeds giue me ſo many pence as the 837 yards were worth at the rate of $\frac{205}{279}$ of a peny the yard.

Theod.

Theod. It was well conſidered, and I greatly commend your diligence, I will yet exerciſe you in a few more queſtions in this Rule to be wrought by practiſe, and the firſt example that ſhall follow, is thus. If I make ouer 1000 li. ſterling by exchange for Flaunders, to receaue 33 ſ. 4 d. Flemmiſh for euery 20 ſhillings ſterling, how much Flemmiſh money muſt I receaue in Flaunders.

li.	ſ.	d.
1000		
33	4	
1000		
333	6	8
333	6	8
1666	13	4

Iuni. I anſwere, when for euery 20 ſ. ſterling you are to receiue 33 ſ. 4 d. Flemmiſh, you muſt then for 1000 li. ſterling receaue 1666 li. 13. ſ. 4 d. Flemmiſh.

Theod. You haue well done, I will giue you only a queſtion or two more to be wrought according to this Rule by practiſe, and then I will goe forward with ſome other queſtions of paiment that are very neceſſary for the trade of marchandize, and are to be wrought by this rule.

Iuni. I pray you followe your determination, and I will be as playable as I may, for I doe perceiue you haue iuſtly commended this Rule to be the moſt excellent of all other, ſo doth it tend vnto more vſes in my opinion then any rule that euer I yet learned.

Theod.

Theod. You ſay truth, you haue learned no proportionall Rule but onely this, therefore it muſt needes tend to more vſe then any rule you haue learned, but by that time you haue learned all the proportionall Rules that are requiſite for Marchants vſes, and find none of them to be wrought without one branch or other of this Rule, then you ſhall haue more cauſe to extoll the excellency of this Rule then yet you haue, for in very deede this manner that you make vſe of is but the firſt branch of this Rule.

Iuni. I pray you ſir, are there more parts to be learned of this Rule?

Theod. There is yet the Backward Rule of 3, the Double Rule of 3. the Rule of 3 compoſed, the firſt and ſecond part, and the Rule of Fellowſhip or company both without time, and with time, and hauing learned all thoſe you ſhall bee ſufficiently inſtructed in the Rule of 3, and many other Rules followeth after theſe which are all to be comprehended by the knowledge of this Rule, onely ſome ſmall manner of worke there will be required in moſt of them, or ſome due conſideration how you ſhall place your numbers according to this Rule, as when you come vnto them it ſhall plainely appeare, in the meane time I will go forwards with this Rule as I intend, and the next queſtion propoſed ſhall be thus: if I ſell 432 yards of Velvet for 462 li. what doe I ſell a yard for?

Yards.	Pounds.	Yards.
432	462	1
30	li. 5	
462	1 30	
432	432	
	72	

Iuni.

Iuni. I anſwere, if 432 yardes of Velvet bee ſold for 462 pounds, the valued price that one yard is ſold for, is 1 li. $\frac{5}{72}$.

Theod. One other queſtion thus: If a common Doller bée woꝛth 3 s. and a Princes Doller bée woꝛth 3 s. 6 d. how many Princes Dollers muſt bee payde for 483 common Dollers?

3 s. 6 d.	483 Dollers.
6 d.	69
414 Princes Dollers.	

Iuni. I anſwere, 414 Princes Dollers are woꝛth 483 common Dollers.

Queſtions of Payment.

Theod. NOw according as I promiſed, I will propound vnto you ſeuerall queſtions of Payment, very neceſſary and behouefull for Marchants. The firſt queſtion propoſed ſhall bee thus; A Marchant muſt pay 453 pounds at thrée payments, that is $\frac{1}{4}$ part at a moneth, $\frac{1}{6}$ part at two moneths, and the reſt at thrée moneths, how much muſt hee paye at euery payment?

	li.	s.
1 moneth.	113	5
2 moneths.	75	10
3 moneths.	264	5
	453	0

$\frac{1}{4}$ $\frac{10}{24}$ $\frac{1}{6}$ $\frac{1}{4}$ 12 $\frac{1}{6}$ $\frac{7}{12}$ 264 5 s.

Iuni. I anſwere, for one fourth to be paid at one moneth being the firſt paiment hée muſt pay 113 li. 5 s. for $\frac{1}{6}$ at 2 moneths, the ſecond paiment 75 li. 10 s. for $\frac{2}{12}$ which is left to be payd at 3 moneths, 264 li. 5 s. which maketh the whole entire ſumme of 453 li.

Theod. You haue well done, now if the ſaid Marchant be to pay 113 li. $\frac{1}{4}$ at one moneth, 75 li. $\frac{1}{2}$ at 2 moneths, and 264 li. $\frac{1}{4}$ at 3 moneths, if he be deſirous to pay it all at one paiment, when ought it to be paid?

Iuni. I am to ſéeke how I may reſolue this queſtion, for as yet I neuer was acquainted with working any the like, therefore I pray you let me craue your helpe.

The. To worke this or any ſuch like queſtion, muſt you onely proportionate euery ſeuerall paiment to his ſeuerall time when it ought to be paide, and multiply the proportions of time into the proportions of money, then adde vp your ſeuerall products into one totall ſum, and diuide that totall by the whole quantitie of money which is to be payd, the quotient ſheweth you when it ought to be paid all at one paiment.

Iuni. Your direction is very plaine, I pray you giue me leaue to anſwere vnto your queſtion. I doubt not but that I ſhall be able not onely to anſwere this but any ſuch like queſtion, to begin I ſet my numbers in order thus;

113 $\frac{1}{4}$	1 moneth.	113 $\frac{1}{4}$	
75 $\frac{1}{2}$	2 moneths.	151	
264 $\frac{1}{4}$	3 moneths.	792 $\frac{1}{4}$	
453		1057	

1 moneths.

2 1

1057 | 2 151

453

Now

Now, I anſwere that 453 li. to bee payde 115 li. ¼ part at one moneth, 75 li. ½ at two moneths, 264 li. ¼ part at three moneths, if you would pay all at one paiment, it ought to be paid at two moneths $\frac{1}{453}$ of a moneth.

Theod. You haue anſwered the queſtion aright, therefore the next queſtion that I will propound vnto you is thus, A Marchant oweth 480 pounds to pay it in fiue moneths, and when 4 moneths are expreſſed, hee payeth 280 pounds, ſaying, take this, and let mée haue the 200 pounds that remaineth as much after the day as I haue payd you before your day the ſumme of 280 pounds, the queſtion is when he ſhall pay the 200 pounds.

Iuni. This queſtion differeth in worke in my opinion from any that I haue yet learned, I pray you therefore let me craue your aduiſe how it may be wrought.

Theod. To worke this or any ſuch like queſtion, you muſt ſubſtract the money payde out of the whole debt and finde what there is yet vnpayd, then ſubſtract the time when the money was aforehand payde out of the time when it ought to be payed, and find what time there is then to come, then ſay by the Rule of 3, if 200 pounds which is yet vnpaid be forborne one moneth, how long ſhall 280 pounds be forborne, then multiply and diuide according to the order of this Rule, the quotient will anſwere your demand.

Iuni. Then to proſecute my worke according to your direction, I ſet downe my numbers in order, as followeth.

Pounds.	Moneths.			
480	5 ½	li.	mon.	li.
280	4	if 200 require	3 ½	what 280
200	1 ½			3
				840

840 | 1 2 4 40 10
400

Now I answere that 200 pound yet vnpaid must bée forborne two moneths $\frac{1}{10}$ part after 5 moneths $\frac{1}{2}$ is expired, because there was 280 pounds paid one moneth before it was due.

Theod. You haue truely answered the question, therfore I now propose vnto you this question, A Marchant oweth 240 pounds to be paide at 6 moneths, but at the end of one moneth $\frac{1}{2}$ hee payeth 60 li, and three moneths after that he payeth 80 li. more, the question is at what time hee shall paye the rest according to his time of 6 moneths, in such sort that neither of them bé hindered thereby?

Iami. To worke this question, I must multiply the money payd by their seuerall times: and according as you shewed mee in the first question of Rules of Payment, I séeke out the certaine time of payment, as if the whole Summe had béene disbursed together, then doe I subtract the money payd out of the whole debt, and likewise I subtract the quantity of time, I finde out of the whole time of 6 moneths, and then worke by the Rule of 3, as you taught me in the last question going

going before, example.

li.							
60	1 $\frac{1}{3}$ moneth.	90	£3		6	0
80	4 $\frac{1}{6}$ moneth.	360	45	0	3	$\frac{3}{14}$
140	240	450	£4	0		
	140				2	$\frac{11}{14}$
	100			li.		

li.	mo.	
	39	
100	2 $\frac{11}{14}$	140
1400		1260
		420
		5460

1		
£2	mo.	639
546	0 |	126
£480	0 | 3	140
		70
		10

Now is the queſtion anſwered, 100 li. yet vnpaid muſt be forborne 3 moneths $\frac{2}{10}$ parts after 6 moneths is expired, becauſe there was 140 li. paid 2 moneths and $\frac{11}{14}$ parts before it was due.

Theod. You haue well done, I will yet trie you with three or foure queſtions of variable qualitie in Rules of Paiment, and ſo will leaue you with this rule, & go forward with ẏ backward rule of 3, the queſtion I will propound vnto you ſhall be thus; A Marchant is indebted to pay the 24 of May 300 li. whereof he paid the 29 of Aprill the ſame yeare 80 pounds, and the 9 of May after 120 pounds, the queſtion is

vpon what day he ſhall pay the reſt of the money.

Po.	Dayes.				Dayes.
80	25	2000	38|00	19	Theſe 200 li. were
120	15	1800	22|00		paide before the
200		3800			time.

If 100 pounds beforborne 19 dayes, how long ſhall 200 pounds be forborne?

100	19	200		
		1800	38|00	Dayes.
		2000	22|00	38
		3800		

Iuni. I anſwere, if 200 li. be paid 19 daies before the time, 100 pound muſt be forborne 38 dayes after the 24 of May, ſo that it muſt needs be paid the firſt day of July.

Theod. You haue well done, the nert queſtion which I will propound vnto you is thus: A Marchant is indebted to pay 600 pounds in three moneths, he offereth to pay him ready money, ſo that the party will rebate him 2 ½ *per cento* of his principall, the queſtion is how much he muſt pay in ready money.

Iuni. To worke this queſtion, I ſubſtract 2 ½ out of 100 li. and there remaineth 97 ½, and then ſet my three numbers in order thus.

100 li.

li.	li.	s.	li.
100	97	15	600
	20		
	1955		
	600		s.
	1173000	xxx730 00	11730
		xxxxx 00	586 li. 10 s.

Now I anſwere 600 li. which ſhould haue bẽne forborne three Moneths, and is payd in ready money rebating 2 $\frac{1}{2}$ *per cento*, will be payd with 586 Pounds 10 ſhillinhs after the rate.

Theod. Yet one other ſuch like queſtion, and that is thus, A Marchant is indebted 685 li. to bee payd in 5 Moneths, which he will pay in ready money ſo he may haue 4 *per cento* rebated, that is, out of euery 100 li. he will bee rebated 4 pound, the queſtion is what hee muſt pay in ready money. 7

Iuni. If ye deſire but to haue 4 pound rebated out of euery 100 Pounds, I may here worke by the Rule, and ſay, If 100 Pounds abate 4 Pound, what ſhall 685 Pounds abate? hauing multiplyed and diuided according to the manner of this rule, I find that 658, pound $\frac{2}{7}$ parts of a pound ready money, will pay 685 pounds which ſhould haue bẽn paid at 5 Moneths, rebating 4 li. out of euery 100 pounds.

Theod. I ſee you haue ſufficient experience in theſe Rules of Payment; I will onely propoſe vnto you 2 or 3 other queſtions of variable quality, which are to be wrought according to this Rule, and ſo will proceed forwards: the firſt queſtion that I will propoſe vnto you is this, A Marchant is to pay 675 Pounds, 8

whereof he hath paid 124 Duckets at 3 ſ. 11 d. ỹ péce, and 62 Riders Dollers at 2 ſ. 4 d. the péce, the queſtion is how much he hath to pay.

Iuni. This queſtion is very eaſily anſwered, I firſt ſéke by practiſe what the Duckets and Dollers doth amount vnto in the whole ſumme, then I ſubſtract their values, and what remaineth muſt be the debt owing, example.

					675			
At 3 ſ. 11 d. the Du. what	124				31	10	4	
	20	13	4	reſt	643	9	8	
	3	2	0	vnpaid.				
		10	4					
At 2 ſ. 4 d. the Dol. what	62	24	5	8				
	6–4		7	4	8			
	1–0–8		31	10	4			
	7–8–4							

It is anſwered, as the example ſheweth, there is yet vnpaid 643 li. 9. ſhillings, 8 pence.

9 Theod. Now anſwere me to this queſtion, A Marchant is to receaue a ſumme of money which is offered him in Duckets at 4 ſ. 6 d. the péce, which are no more worth then 4 ſ. 5 d. the péce; or elſe in other money at 3 ſ. 4 d. the péce, and worth 3 ſ. 3 d. the péce, the queſtion is what money he ſhall receaue to haue the leaſt loſſe.

Iuni. It is manifeſt without any worke, to loſe 1 d. in 4 ſ. 6 d. is not ſo great a loſſe, as to loſe 1 d. in 3 ſ. 4 d. wherfore it is better for him to receiue Duckets of 4 ſ. 6 d. that are worth but 4 ſ. 5 d. then to receiue other péces for 3 ſ. 4 d. that are worth but 3 ſ. 3 d.

Theod. Séeing you are ſo capable to reſolue a queſtion

ſtion without worke, I will demand of you this queſtion, A Marchant hath a peece of Sattin of 24 yards $\frac{1}{2}$ part, whereof hee ſelleth 10 yards $\frac{1}{2}$ for 10 ſ. 4 d. the yard, & the reſt for 10 ſ. 6 d, the queſtion is how much he receaueth for the whole peece.

Iuni. I anſwere this queſtion by practiſe, thus: I firſt ſubſtract 10 yards $\frac{1}{2}$ from 24 yards $\frac{1}{2}$, and there remaineth 13 yards $\frac{1}{2}$, then I ſay by practiſe at 10 ſ. 6 d. what 10 $\frac{1}{2}$.

24	1	
10	2	
13	3	

5	3	4
	5	2
5	8	6
7	4	$4\frac{3}{4}$
12	12	$10\frac{1}{2}$

	Par.	Quar.	
At 10 ſ. 6 d. what	13	2	
	6	10	
		6	6
		5	3
		2	$7\frac{1}{2}$
	7	4	$4\frac{1}{2}$

I find that 10 yards $\frac{1}{2}$ being ſold at 10 ſ. 4 d. the yard, amounteth to 5 li. 8 ſ. 6 d, & 13 yards $\frac{1}{2}$ at 10 ſ 6 d. the yard, amounteth to 7 li. 4 ſ. 4 d. $\frac{1}{2}$ peny, then is the whole 24 yards ſold for 12 li. 12 ſ. 10 d, $\frac{1}{2}$ peny, as by the example appeareth. Theſe queſtions ſeeme ſo eaſie that I could wiſh not to ſpend much time in them, but rather goe forward, for I greatly deſire to haue the full and perfect vſe of Arithmeticke.

Theod.

Theod. I will only propound vnto you one or two queſtions and ſo leaue this Rule, the firſt is thus, A Marchant hath bought 300 li. worth of Corne, that is to ſay, Wheate for 4 ſhillings 2 pence the buſhell, Rie for 3 ſ. 8 d. the buſhell, and Barley for 3 ſhillings the buſhell, and as often as he taketh 3 buſhels of Wheat he taketh 5 buſhels of Rye, and for euery 7 buſhels of Rye hee taketh 9 buſhels of Barley, the queſtion is how many buſhels he muſt haue of each ſort?

Iuni. I feare mee I am now to ſéeke, but neuertheleſſe I will try my skill, and if I bee in doubt of any thing I will craue your helpe.

Theod. I will referre this and two or three other ſuch like queſtions to be wrought at your leaſure, onely I will giue you a direction for the working of this & all ſuch like, which is thus; you muſt firſt caſt vp the valued price of three buſhels of wheat which is 12 ſ. 6 d. then you muſt ſéeke the valued price of 5 Buſhels of Rye which is 18 ſ. 4 d. their two proportions béeing certaine, it is ſaid the proportion of Barley which you deliuer muſt be 9 Buſhels of Barley for 7 Buſhels of Rye, therefore you muſt ſay by the Rule of 3, if 7 buſhels of Rye be for 9 of Barley, how many buſhels of Barley ſhall 5 Buſhels of Rye bee for: hauing wrought according to the manner of this Rule, you ſhall find 6 buſhels $\frac{3}{7}$ the valued price whereof is 19 ſ. 3 d. $\frac{1}{7}$, then you muſt adde 3 buſhels of Wheate, 5 of Rye, and 6 $\frac{3}{7}$ of Barley together, they make 14 Buſhels $\frac{3}{7}$, which muſt be the ſecond number in the Rule of 3, then you muſt adde the valued price of thoſe ſeuerall quantities of buſhels together, which you ſhall find to be 50 ſ. 1 d. $\frac{1}{7}$, and that you muſt take for your

firſt

firſt number in the Rule of 3, then 14 $\frac{3}{7}$ of a buſhell muſt be the ſecond number, and then muſt 300 li. bee the third number: hauing multiplyed and diuided, you ſhall find that you are to deliuer all the three of ſeuerall quantities 1727 buſhels $\frac{133}{427}$ of a buſhell, then to ſeeke out their quantities in ſeuerall, their proportions may be as 3 to 5, and 7 to 9, you muſt make three ſeuerall workes, taking 14 $\frac{3}{7}$ for your firſt number in euery worke, 1727 $\frac{133}{427}$ for your ſecond number in euery worke, for your third number in the firſt worke three buſhels of Wheat, for your third number in your ſecond worke 5 buſhels of Rye, for your third number the third worke 6 $\frac{3}{7}$ buſhels of Barly, your quotients will giue you how much muſt be deliuered of euery ſeuerall quantity, which you ſhall find to be, viz. of wheat 359 buſhels $\frac{61}{427}$, of Rye 598 buſhels $\frac{1444}{427}$, of Barley 769 buſhels $\frac{2516}{427}$, which being added together maketh the iuſt quantity of 1727 buſhels $\frac{133}{427}$: but to bee certaine that your queſtion is hereanſwered, you muſt diuide three whole by 359 $\frac{61}{427}$, and you ſhall finde it contained 119 times $\frac{346}{427}$ of a time, then diuide 5 whole by 598 $\frac{1444}{427}$, and you ſhall finde it contained 119 times $\frac{340}{427}$ of a time, ſo that it is certaine that for euery 3 buſhels of Wheat you haue deliuered 5 buſhels of Rye. Now to know that you haue deliuered Nyne buſhels of Barley for euery Seauen buſhels of Rye, you muſt diuide 598 $\frac{1444}{427}$, which is your iuſt quantity of Rye that you haue deliuered by 7, you ſhall find it contained 85 times $\frac{217}{427}$ of a time, then diuide your whole quantity of Barley which is 769 $\frac{2516}{427}$ by 9, you ſhall find it contained 85 times $\frac{217}{427}$ of a time, ſo ſhall you anſwere the queſtion how much there

ought

ought to be deliuered of each ſort, and that their quantities be in proportion according to the demaund.

Theod. I heartily thanke you for your great paines in explaining of this queſtion, for it ſeemed to me very harſh, and I know well I ſhould haue hardly effected it according to your expectation, but now me thinketh I ſhould be able to reſolue that or any ſuch like queſtion, therefore I pray you goe forward with the reſt of the queſtion that you intend to haue practiſed by mee, according to this rule, if they be of this nature I hope I ſhall need no further direction, but be able to anſwere them my ſelfe.

12 Theod. The next queſtion propounded is thus, A Marchant hath bought 26 Tunnes and 3 Barrels of Beere at 32 s. the Tunne vpon condition, that as often as he payeth ready mony for two Tunnes, hee would pay for three Tuns in meale at 32 s the Tun, accounting 6 Barrels to a Tunne, the queſtion is how many tuns of meale he ſhall deliuer, and how much he paieth in money: multiply and diuide according as was ſhewed you in the laſt example, and you ſhall finde that you are to pay for 10 Tuns $\frac{1}{7}$ in ready money, and 15 $\frac{2}{10}$ in meale, whoſe proportions are as 3 to 2.

Iun. I pray you giue mee leaue, I take it this queſtion is eaſie inough to be comprehended, for according as you haue before taught me, I adde the two proportions together 3 and 2 which maketh 5, that I take for my firſt number in the Rule of 3, ſaying, if 5 require 26 Tunnes $\frac{1}{7}$ what ſhall 2 require: then in the ſecond

worke

worke if 5 require 26 $\frac{1}{3}$ what doth 3 require? I find in my firſt worke 10 Tunnes $\frac{1}{15}$, and in the ſecond worke 15 Tunnes $\frac{7}{10}$, which maketh the iuſt number of 26 Tunnes $\frac{1}{3}$, now for proofe to know whether hee paieth for 2 Tunnes in readie money as often as he paieth for 3 Tunnes in meale, I diuide 10 $\frac{1}{15}$ by 2, and it is contained 5 times $\frac{1}{10}$ of a time, then I diuide 15 $\frac{7}{10}$ by 3, and it is contained 5 times $\frac{1}{10}$ of a time, ſo is my queſtion truely anſwered.

Theod. I ſtill commend your diligence, I will giue you one other queſtion, and ſo proceed to the backward Rule, A Marchant hath bought 3 $\frac{1}{3}$ great hundreth, leſſe 2 hundred and 48 Clapboards without the allowance at the rate of 25 li. 10 s. the hundreth, the queſtion is how much it amounteth vnto. 13

Iuni. I pray you acquaint mee with the manner of allowance, or otherwiſe I ſhall not be able to anſwere to your demand.

Theod. You muſt know that one great Hundreth is 24 ſmall hundreths, and the ſmall hundreth is 120, and for euery great hundreth there muſt be 48 boardes taken away, and for euery ſmall hundreth 2, and for euery 60 one board: or if it be 119 but 1, and if there be vnder 60 then there is nothing allowed of. #

Iuni. The allowances are ſo plainely explained, that I were now very ſimple if I could not reſolue your Queſtion, therefore I beginne thus, I firſt put the great hundreds into ſmall hundreds which

which maketh 87 ſmall hundreds, then I ſubſtract the two hundred 48 bords from them, there remaineth 81 ſmall hundreths 72 bords, then being allowed two bords vpon euery ſmall hundred it maketh 162 bords, and for 72 bordes I allow 1, becauſe it is aboue 60 and not a full hundred, ſo the whole number to be allowed is 143 bordes, which I ſubſtract out of 81 hundred 72 bords, there remaineth 80 ſmall hundreth 29 bordes, which is three great hundreths, eight ſmall hundreths, and 29 bordes, which I worke at 25 pounds 10 ſhillings the hundred, and it amounteth vnto 85 pounds 5 ſhillings 1 penny $\frac{1}{2}$ of a penny, as by this example appeareth.

	Gr. C.	Sm. C.		Bords.
At 25 li. 10 ſ. what	3	8		29
	76	10		
	8	10		
		5	1	$\frac{1}{2}$
	85	5	1	$\frac{1}{2}$

The

The backer Rule of 3.

Theod. IN this backer Rule of 3 you haue alwayes three numbers, as you haue in the Rule of 3 direct, and the ſame manner is to bee obſerued in this rule for the place of your number that was obſerued in the Rule of 3 direct, that is, the firſt and the third numbers muſt be alwaies of one denomination, and of what denomination the ſecond number is the ſame ſhall the fourth bee, but your manner of worke is contrary, for you muſt here multiply the firſt number by the ſecond, and diuide by the third number, as by this firſt example it ſhall appeare, if when the buſhell of Wheat coſt 48 pence, the penny loafe wayeth 6 ounces, how much ſhall it way when the buſhell of Wheat coſt but 32 pence.

Iuni. I pray you let mee worke this queſtion my ſelfe, I perceiue there is no more difficulty in the working of this rule, then in the Rule of 3 direct, there is onely a due obſeruation required whether of the two rules it requireth: therefore to beginne my worke, I ſay, if 48 pence the buſhell require the penny loafe to waigh 6 ounces, what ſhall 32 pence require? now I perceiue, if I ſhould multiply the ſecond number by

the

the third, and diuide by the firſt accoꝛding to the Rule of 3 direct, the fourth number pꝛoduced will be a leſſe quantity of waight then the ſecond number is, but if I multiply the firſt number by the ſecond, and diuide by the third, the fourth number pꝛoduced will be moꝛe then the ſecond, and ſo ſhall it bee becauſe the valued pꝛice of the ſecond is leſſe then the valued pꝛice of the firſt, and beſides that, I doe perceiue that the waight of the two leaues will be in pꝛopoꝛtion one to the other, as the valued pꝛiſes are one to the other, example.

Dayes.	Dunces.	Dayes.		
48	6	32		
6			x	
288			288	Dunces.
			32	9

Theod. You haue well done, let me now pꝛoue you with another queſtion which ſhall be pꝛounded vnto you, thus; If eight woꝛkemen make a peꝛce of woꝛke in 9 dayes, in how long time ſhall the ſame peꝛce of woꝛke be made by 6 woꝛkemen.

Iuni. I ſay if Woꝛkemen.	Dayes.		Men.
8	9		6
9	x		
72	72		Dayes.
	66		12

It is anſwered, that a peꝛce of woꝛke that 8 men will finiſh in 9 dayes, 6 men muſt haue 12 dayes to finiſh it.

Theod. I haue fiue yards of Cloth that is Tenne quarters

quarters broad, how much lyning will ſerue to lyne it of ſtuffe that is 6 quarters broad.

Quarters.	Yards.		Quarters.
10	5		6
5	2	yards.	1
50	10	8	2
	10		6
			3

Anſw. I anſwere, 8 yards $\frac{1}{2}$ in length of 6 quarters broad will ſerue to lyne a peece of Cloth of 5 yards in length and 10 quarters broad.

A queſtion of Money lent.

Theod. A Marchant lendeth his Friend 280 li. for three moneths without intereſt, the queſtion is how much the other muſt lend him againe for 4 moneths, ſo that the firſt may not be damnified.

If three moneths require 280 pounds, what will 4 moneths require.

3

840 | 840 | 210 li.

Anſw. I anſwere, If 280 li. be lent for 3 moneths, 210 li. muſt be lent for 4 moneths, to requite the curteſie thereof without damage to either.

A queſtion of marſhall affaires.

Theod. I Demaund of you this queſtion, A Caſtell is beſieged wherein are 450 Souldiers, and the ſame is victualled for 5 moneths: now the Souldiers doubting the ſiege will continue longer time, they determine to put forth ſo many of their ſouldiers, that the ſame victuals may laſt the reſidue that continueth 9 moneths; the queſtion is how many there muſt remaine, and how many there are to be diſmiſſed.

If 5 moneths ſatisfie 450 how many will
450 9 moneths ſatisfie 250
5 200 diſmiſſed.

2250 | 4
2250 | 250 remaine.
999

Iuni. I anſwere, if the victuall will ſatisfie 450 for 5 moneths, it ſhall ſatisfie 250 for 9 moneths, ſo many muſt there remaine, then ſubſtract 250 out of 450 and there remaineth 200 to be diſmiſſed.

Theod. I will now leaue you for this Rule, and proceed to certaine queſtions of Loane and Intereſt, to be wrought by the Rule of 3 direct. The firſt queſtion I will propound vnto you is this, If I lend 248 li. to receaue at the end of one yeare both principall & gaine (after the rate of 6 li. the hundred) how much ought I to receaue.

Principall

Princ. li.	Gaines. li.	Princ. li.				
100	6	248	14	88		1488
		6	xx	00		100
		1488				50
					li.	25
					262	

Iuni. I anſwere, if 100 li. gaine 6 li. 248 li. principall ſhall gaine 14 li. $\frac{88}{100}$, or otherwiſe, I am to receiue both principall & gaine at the end of the yeare 262 li. $\frac{88}{100}$, as the example ſheweth.

Theod. You haue anſwered the queſtion well, but it had bin more directly anſwered if you had wrought it thus, if 100 li. principall be 106 li. principall and gaine, how much will 248 li. principall be.

Iuni. I pray you giue me leaue ſo to worke it.

Princ. li.		Princ. li.		Princ. li.
100		106		248
		22		106
	li.	44		1488
262	88	262	88	2480
xxx	00		100	26188
			50	
			25	

It is a better manner of working indeed, and I giue you heartie thankes for your inſtruction, for I now perceiue the queſtion is anſwered without any addi-

tion, where in my former worke finding my quotient to be but 141i. and $\frac{32}{379}$, I was very doubtfull whether I had wrought truely or not, before I did conſider it was but the gaine of 248 li. onely, and then reaſon gaue me I was to adde the principall vnto it, becauſe my queſtion demanded both principall and gaine.

Theod. It was well conſidered, and you may vſe either way which you liſt, but in my opinion I held the laſt way beſt, I will onely giue you one other ſuch like queſtion, and then proceed to the Double Rule of 3, and the queſtion to be giuen is thus; If I lend 348 pounds to receaue at the end of a yeare both principall & gaine, after the rate of 9 pound the hundred, how much muſt I receaue?

		Prin.	Pi.	Li.	Li.
			100	109	348
			8		109
			16		3132
		li.	32		3480
379	32	379	100		37932
xxx	00		50		
			25		

Iunii. I anſwere, if 100 pound principall in one yeare become 109 pound principall and gaine; 348 pound principall will be 379 pound $\frac{32}{379}$ principall and gaine.

The

The double Rule of 3.

The firſt Part.

Theod. IT is well anſwered, we wil now proceed to the Double Rule of 3: the firſt queſtion I will propound vnto you is thus; if I deliuer 674 li. principall for 4 moneths to receiue both principall and gaine after the rate of 12 pound the hundred for twelue moneths, how much ought I to receiue. To worke this or any ſuch like queſtion according to this Rule, you may firſt ſay by the Rule of 3 Direct, If 100 li. principall gaine 12 li. what ſhall 674 li. gaine, multiply and diuide, and you ſhall find 80 li. $\frac{32}{75}$; then ſay by the ſame Rule of 3 Direct, if 12 moneths require 80 li. $\frac{32}{75}$ what doth 4 moneths require, multiply and diuide & you ſhall find 26 li. $\frac{14}{75}$, which being added vnto 674 li. principall, maketh 700 li. $\frac{32}{75}$ of a pound principall and gaine.

Iuni. I pray you giue me leaue to worke this queſtion according to your inſtruction, firſt I ſay,

If 100 li principall gaine 12 li. what 674 li.

			22	12
			88	1348
80	88	80		674
xx	00		100	8088
			25	

Here I find as 100 li. in 12 moneths gaineth 12 li. so shall 674 li. gaine 80 li. $\frac{22}{25}$; now I say againe,

If 12 Mon. require 80 li. $\frac{22}{25}$, what 4 Mon.

			24		8088
x			72	25	
xx		li.	144	60	
88	88	26	288	24	
33	00		300	300	
			150		
			75		
			25		

Here I finde as 12 moneths require 80 li. $\frac{22}{25}$ of a pound, so 4 moneths requireth 26 li. $\frac{24}{25}$ of a pound, which gaine being added vnto the principall maketh 700 li. $\frac{24}{25}$ of a pound, so that I answere if 100 pound principall become 112 pounds principall and gaine in 12 moneths, 674 pounds principall will in 4 moneths become 700 pounds $\frac{24}{25}$ of a pound principall and gaine, but I pray you may I not give a solution to the question both of principall and gaine without any addition?

Thood. No, but I will shew you how you may answere

anſwere this or any ſuch like queſtion in one worke by another Rule, which is the firſt part of the Rule of 3 Compoſed.

Iuni. But I pray you ſir, why doe you tearme this queſtion (as I haue wrought it) the firſt part of the Double Rule of 3, are there more parts of this double Rule?

The Rule of 3 Compoſed.

The firſt Part.

Theod. THere is the firſt and ſecond part; by the firſt part of the double Rule of 3 you may comprehend any queſtion that ſhall be propounded vnto you of fiue numbers, and requireth in both workes the Rule of 3 Direct, and all ſuch queſtions are to be wrought by the firſt part of the Rule of 3 Compoſed in one worke.

Iuni. I pray you then ſhew me the manner of working according to the firſt part of the Rule of 3 Compoſed, for I am perſwaded I ſhall make little vſe of the firſt part of the Double Rule of 3, if I find the other to be a more compendious methode.

Theod. The firſt part of the Rule of 3 Compoſed hath alwayes 5 numbers, and of what nature or denomination your firſt number is, of the ſame nature or denomination muſt your fourth number be; and of what nature or denomination the ſecond number is, of the ſame nature or denomination muſt the fift number be; and of what nature or denomination the

third number is, of the ſame nature or denomination ſhal the firſt number be that anſwereth to your queſtion how ſo euer your queſtion be propounded, you muſt be ſure to obſerue this method in placing of your numbers, your numbers being thus placed you muſt multiply the 3, the 4, and 5 numbers one into the other for your diuidend, then you muſt multiply the firſt and ſecond numbers one into the other for your diuiſor, hauing diuided thoſe two products one by the other, the quotient gineth you your deſire.

Imi. You haue explained the manner of this rule ſo plainely, that I doubt not but I ſhal be able to anſwere this queſtion or any other according to this rule, therefore I will firſt make tryall (if you pleaſe) by this queſtion laſt wrought by the double Rule of 3, to ſhape my queſtion according to your direction, I ſay if 100 li. in 12 moneths gaine 12 pounds, what ſhal 674 pounds gaine in 4 months: to begin my worke, I ſet my numbers thus.

Pr. li.	Mo.	Ca. li.	Pri. li.	Mo.
100	12	12	674	4
	100		4	
	1200		2696	
1	24		12	
2	144		5392	
288 1 li.	576		2696	
3223|52	26.288		32352	
2227|00	1152			
2	1200			
	600			
	300			
	150			
	25			

It

I anſwere, as 100 li. in 12 moneths ſhall gaine 12 pounds, ſo 674 li. in 4 moneths after that rate ſhall gaine 26 li. $\frac{24}{25}$ of a Pound, which being added vnto 674 li. principall maketh 700 li. $\frac{24}{25}$ of a pound principall and gaine. Now doe I heartily thanke you for your inſtruction in this Rule, for it ſeemeth very briefe in worke and pleaſant in vſe; yet neuertheleſſe if you pleaſe to propound vnto me a queſtion or 2 more, I will worke them by both theſe rules becauſe I hope I ſhall attaine the more knowledge thereby.

Theod. I will ſatiſfie your deſire, the firſt queſtion is thus, A Marchant is to Shippe for *Plymouth*, which is 120 Leagues diſtant from this place 57 Tunnes of goods at the rate of 29 li. for the whole fraight, hee is alſo from *Plymouth* deſirous to fraight another Shippe for *Leaghorne* in the Straights, whoſe diſtance is 480 Leagues, the lading of the ſhip is 171 Tuns, and hee will paynether more nor leſſe then hee payde for his fraight from *London* to *Plymouth* according to the ſame rate, I demaund what hee muſt pay for his fraight at Leaghorne?

Iuni. I doe conſider the rate of his fraight from London to Plymouth is 29 li. for 57 Tuns to be tranſported 120 Leagues, therefore I ſay firſt by the Rule of 3, if 120 Leagues require 29 pounds, what will 480 Leagues require.

Example.

Example.

Lea.	li.	Lea.
120	29	480
		29
		4320
	li.	960
	116	13920

x
x7
x3g2 | 0 |
x2x2 | 0 |
x1

I finde that 480 leagues will require 116 pounds for 57 Tunnes to be transported so farre, therefore I now say in my second worke, if 57 Tuns require 116 pounds, what will 171 Tunnes require?

Example.

Tunnes.	li.	Tunnes.
57	116	171
		116
		1026
	li.	171
	348	171
		19836

2 4
4 7 5
x9836
5777
55

I answere, if the transporting of 57 Tunnes of goods 120 Leagues cost 29 pounds: 171 Tunnes to be transported 480 Leagues, after that rate will cost 348 pounds. Now, to worke this question according to the Rule of 3 compoſed, I ſet my numbers as they are here expreſſed.

Tunnes

Tunnes.	Leag.	li.	Tuns.	Leag.
57	120	29	171	480
120				171
1140				480
57				3360
6840				480
				82080
				29
		li		738720
				164160
		348		2380320

56
84
3263
54457
2380320 |0| 348
68444 |0|
688
6

Theod. One other question, and then we will proceed to the next Rule. If I pay for the vse of 725 li. for 9 moneths 54 pounds 7 shillings 6 d. what shall I pay for the vse of 5075 pounds for five moneths after that rate?

Iuni. I first beginne thus, if 9 moneths require 54 pounds 7 shillings 6 pence, what shall 6 moneths haue? now, because it were very tedious to reduce my pounds and shillings into pence, knowing 7 shillings 6 pence to be the $\frac{3}{8}$ part of a pound, I expresse my numbers as followeth.

Moneths.

Moneths.	Li.		Moneths.
If 9	54	½	6

8

In the 2 worke I say. 2610 ꝛ6ꝛo|ꝛ9o|36 ½

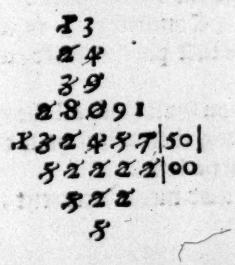
Pz. li.	Int. li.		Pz. li.		
If 725	36	¼	5075	999| 88|	4

4 145

2900	3		25375
2	87		20700
ꝛꝛ4	li. 435	s.	5075
3ꝛo 1	2175	15	735875
7338|75|253	2800		
2999|00|	580		
ꝛꝛ	116		
	4		

I answere, if I pay for the vse of 725 li. principall for 9 moneths 36 li. 7 s. 6 d. at that rate I must pay for the vse of 5075 li. for 6 moneths 253 li. 15 s, now according to the Rule of 3 Compoſed, I ſet my numbers thus.

If	Pz. li. 725	Mo. 9	Int. li. 54 ½	Pz. li. 5075	M. 6
	9			435	
	6525		435	25375	
	8			15225	
	52200			20300	
				2207625	
				6	
				13245750	



Theod. You worke very perfectly, but I marualle who taught you to worke this queſtion according to the manner of Fractions.

Iuni. I did conſider in the Rule of 3 in Fractions, that I take the ſame Numerators to multiply together, whoſe numbers I multiply in whole numbers, and multiply that product into the denominator of the firſt, and alſo as I ſhould diuide by the firſt in whole numbers, I multiply this Numerator into the reſt of the denominators, the ſame order I haue obſerued here.

Theod. You haue well done, and ſo muſt you alwayes doe when you worke any queſtion that may be comprehended by the firſt part of the Rule of 3 Compoſed in Fractions, you muſt multiply the numerators of the 3, the 4, and 5 numbers together one into the other, that product into the denominators of the firſt and the ſecond numbers for your dividend, and then you muſt multiply the Numerators of your firſt and ſecond numbers one into the other, the product thereof into the denominators of the third, the fourth, and fift numbers for your diuiſor, and thus we will leaue this Rule.

Iuni.

Iuni. I pray you proceede to the ſecond part of the Double Rule of 3 and Rule of 3 Compoſed, I take it they tend both to one vſe, as the firſt part of theſe rules doth.

Theod. They doe ſo, and you ſhall haue all the furtherance I can for your attaining thereunto, your diligence and knowledge deſerueth no leſſe.

Iuni. I thanke you for your good incouragement, I pray you proceed as you intend.

Of the double Rule of 3. or Rule of 3 Compoſed.

The ſecond Part.

Theod. The nature of this Rule is ſuch, that it reſolueth any queſtion that is propounded with 5 numbers, and requireth both of the Rule 3 Direct and the backward Rule of 3 for the ſolution thereof; and to make it the plainer vnto you, I will here propound vnto you one queſtion of intereſt, which ſhall be thus: A Marchant payeth for the vſe of 725 pounds principall for 9 moneths 54 li. 7 ſ. 6 d. how much principall ought there to be lent him for 6 moneths, paying 253 li. 15 ſ. for intereſt? for your better vnderſtanding of this Rule, I would with you to worke this queſtion firſt by the Double Rule of 3.

Iuni. I will gladly follow your aduiſe, therefore I begin thus, ſaying, if 9 moneths require 725 pounds principall, what will 6 moneths require?

Example.

Example.

Mo.	Li.	Mo.
9	725	6
	6	

Theod. You haue ill done already, this queſtion conſiſteth of two rules, both of the Rule of three direct, and of the backward Rule of three, therefore if you haue a due conſideration of the numbers you haue already ſet downe, you muſt worke according to the Backward Rule of three; for, conſider in your owne reaſon, whether 6 moneths doth not require more principall for the firſt quantity of intereſt, then 9 moneths doth, the leſſe time for ſo much intereſt the more principall money muſt be lent; Now, if you worke by the Rule of three direct, that is, to multiply 6 the third number by 725 the ſecond number, and diuide by 9, the quotient will giue you a leſſe quantity of principall to bee lent for 6 moneths then there is lent for 9 moneths, and all for one conſideration, and that may not be, therefore you muſt worke by the backer Rule of three, and then ſhall you finde a greater quantity of principall for 6 moneths then you haue for 9 moneths, as the queſtion requireth.

Iuni. Sir, I confeſſe mine error, I was ouer raſh, for had I duely conſidered the queſtion, I might eaſily haue ſeene mine error that I raſhly committed, and ſeeing you haue explained the manner of this rule ſo plainly, I hope it ſhall free me from offending in any the like hereafter: therefore I begin to worke the ſame queſtion againe thus.

Example.

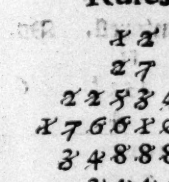
Example.

Mo.	Li.	Mo.		
9	725	6		
	9	43		1
	6525	6525	1087 ½	
		6666		2

I find by my firſt worke being wrought by the backward Rule of 3 (as the neceſſity of the queſtion requireth) if 725 li. principall be lent for 9 moneths for the firſt conſideration of Intereſt, there muſt be lent for 4 moneths 1087 pounds 10 ſhillings for the ſame conſideration, therefore now I ſay, if 54 li. 7 ſ. 6 d. Intereſt, require 1087 li. 10 ſ. principal, what will 253 li. 15 ſ. Intereſt require.

Example.

Intereſt. li.	Principall. li.	Intereſt. li.
54 ¾	1087 ½	253 ¾
8	2	4
435	2175	1015
2	1015	
870	10875	
4	2175	
3480	21750	
	2207625	
	8	
	17661000	



I anſwere, if 752 pounds principall in 9 moneths require 54 pounds 7 ſhillings 6 pence intereſt for five moneths, paying 253 pounds intereſt, there ſhall bee lent 5075 pounds principall; now, whether my numbers are here to be placed as they were placed in the firſt part of this Rule of three Compoſed, I am doubtfull.

Theod. You muſt place your numbers heere as you did in the firſt part of the Rule of three Compoſed, but when they are ſo placed you muſt worke thus, you muſt multiply the firſt number by the fift for diviſor, and the ſecond number, the third, and the fourth one to the other for dividend, dividing thoſe two products one by the other, the quotient giueth you the number that anſwereth to the queſtion.

Iuni. I doubt not but I ſhall eaſily comprehend this or any ſuch like queſtion, wherefore I firſt place my numbers as I did in the firſt part of the Rule of 3 Compoſed, and then proceed to the order of worke according to your inſtruction.

Intereſt. li.	Mon.	Princ. li.	Intereſt. li.	Mo.
54 1/2 8	9	725	253 3/4 4	6
435 6			1015 725	
2610 4			5075 2030	
10440			7105 735875 9	
			6622875 8	
			2983000	

2
7552
5272830000 | 0 | 5057 principall.
2044444440
204444
2000
2

Anſwere, if 54 li. 7 ſ. 6 d. intereſt in 9 moneths requireth 725 li. principall, 253 li. 15 ſ. intereſt in ſix moneths will require 5075 li. principall.

Theod. You haue well done, I will giue you anely one other queſtion to be wrought by this rule, and then will proue you with diuers other queſtions of Intereſt, ſome to be wrought according to the firſt part of this rule, ſome to the ſecond part, and ſome according to the Rule of 3 Direct, with ſome addition to be vſed, becauſe

becauſe I know ſuch queſtions are moſt néedfull for the trade of Marchandize, which is the vſe you intend to make of Arithmeticke, and then we will proceed to the reſt of the rules that follow, which are all to bee comprehended by theſe rules you haue already learned, the queſtion that I will now propound vnto you is thus; If 97 Pioners in 7 dayes will caſt a trench of 679 Rhodes, how many Pioners in 14 houres will caſt a trench of 2037 rhodes.

Iumi. I will firſt beginne with dayes thus, ſaying, if 7 dayes require 97 Pioners, how many Pioners will 14 houres require?

Example.

Dayes.	Pioners.	Houres.		
7	97	14	*x*	
12	84		*3 3 2*	pioners.
84	388		*8 x 4 8*	582
	776		*x 4 4 4*	
	8148		*x x*	

I find that this firſt worke requireth the backward rule of 3, for it is manifeſt that 14 houres the latter quantity of time requireth more men then 84 houres, ſo that as 84 houres requireth 97 men, 14 houres will require 582 men. Now in my ſecond worke I ſay, If 679 Rhodes require 582 Pioners, how many Pioners will 2037 Rhodes require?

Example.

Rho.	Pio.	Rhod.
679	582	2037
		582
		4074
		16296
		10185
		1185534

4
374
820
8745
5x627
xx85534
67999
6777
66

Pioners.
1746

I anſwere, if 679 Rhodes in 7 dayes require 97 Pionors, 2037 Rhodes in 14 houres will require 1746 Pionors. Now by the Rule of 3 Compoſed.

Example.

Rho.	Dayes.	Pion.	Rhodes.	Houres.
679	7	97	2037	14
14	12		97	
2716	84		14259	
679			18333	
9506			197589	
	5		84	
	4773		790356	
	73770		1580712	
	704x23	Pion.	16597476	
	x65597476	1746		
	750666666			
	95000			
	955			
	9			

I anſwere, according to the ſecond part of the Rule of 3 Compoſed, If 679 Rhodes in 7 dayes require 97 Pieners, 2037 Rhodes in 14 houres will require 1746 Pienors.

Theod. It is well done, anſwere mee now to this queſtion, If 100 pounds in 12 moneths gaine 12 li, how much money muſt we haue to gaine 26 pounds in 4 moneths?

Iuni. To worke your queſtion thus propounded, I ſay, if 12 li. intereſt in 12 months require 100 pounds principall, how much intereſt will 26 li. intereſt require in 4 moneths?

Example.

Int. li.	Mo.	Pr. li.	Int. li.	Mo.
12	12	100	26	4
4			100	
48			2600	
2			12	
74		li.	5200	
3 X X C C		650 princ.	2600	
4 S S S				
44				

I anſwere, if 12 li. intereſt in 12 moneths require 100 li. principall, 26 li. intereſt in 4 moneths will require 650 li. principall.

Theod. It is well and truely anſwered, the next queſtion is thus; A Marchant deliuereth 420 li. to intereſt for 3 moneths at 10 li. the hundred by the yeare, and when the time is expired, the debtor requireth to haue the money for 2 moneths longer at 12 li. the hundred ſimple intereſt, how much muſt he receiue for the intereſt of his money?

Iuni. I begynne to worke the queſtion thus, I ſay firſt, if 100 pounds principall in 12 moneths gaine 10 pounds, what ſhall 420 pounds gaine in 3 Moneths?

Example.

Pri. Pl.	Mo.	Cai. Pl.	Pri. Pl.
100	12	10	420 3
	100		3
	1200		1260
			10
	1		12600

$\mathcal{P}\mathcal{A}\ 6 \mid 00 \mid 10\ \frac{6}{12}$ 10 s.
$\mathcal{P}\mathcal{A}\mathcal{A} \mid 00 \mid 2$
$\mathcal{P}$

In my ſecond worke I ſay, If 100 li. principall in 12 moneths gaine 12 li. what ſhall 420 li. principall gaine in two moneths?

Example.

Pri. Pl.	Mo.	Cai. li.	Pri. li.
100	12	12	420 2
			2
			840

		li. 2	li.	s.	d.
84	0	8 $\frac{4}{10}$ 8 s.	8	8	0
10	0	5	10	10	0
			18	18	0

I anſwere, that 420 pounds after the rate of 10 li. the hundred for 3 moneths ſhall gaine 10 li. 10 s. and 420 li.

420 pounds after the rate of 12 li. the hundred for a yeare, in 2. moneths ſhall gaine 8 li. 8 ſ. ſo the gaine is 18 li. 18 ſ.

Theod. Anſwere me to this queſtion: A Marchant deliuereth 800 li. to intereſt for 4 moneths at 6 pounds the hundred by the yeare, and hee deliuereth to the ſame man 900 li. more for 6 moneths at 8 li. the hundred by the yeare, and at laſt hee agreeth to receiue his money all at one payment. The queſtion is, when the money muſt be paid, and how much the intereſt mony is in all.

Iuni. To worke this queſtion I ſay, if 100 pounds principall in 12 moneths gaine 6 li. what muſt 800 li. gaine in 4 moneths.

Example.

Pri. li.	Mo.	Ga. li.	Pri. li.	Mo.
100	12	6	800	4
	300		4	
	1200		3200	
			6	
	li.		19200	

X 9 X | 00 | 16 intereſt.
X Z X | 00 |
X

Pr. li.	Mo.	Ca. li.	Pr. li.	Mo.
If 100	in 12	8	900	6
	100		6	
	1200		5400	

	li.
	99 16
	90 16
	52 li. intereſt

Here I anſwere 800 li. lent for 4 moneths after the rate of 6 li. the hundred for a yeare, doth require 16 li. intereſt, and 900 li. for 6 months after the rate of 8 li. the hundred for a yeare doth require 36 li. intereſt, the whole intereſt required is 52 li. Now, to know when it ought to be payd all at one payment, I ſay by the rule of Payment there is 816 li. principall and gaine to bee payd at 4 moneths, and 936 li. at 6 moneths, when ought it to be payd at one payment?

			Example.		
816	4	3264	2		35
936	6	5616	33	mon.	60
1752		8880	8880	5	120
			1752		1752
					876
					438

I anſwere, it ought to be payd all at one payment at 5 moneths $\frac{438}{1752}$ of a moneth.

Theod. I perceiue you forget not what hath beene taught you, you haue well anſwered the queſtion, the next

nert queſtion is thus, A Marchant deliuereth 300 li. to intereſt for 12 moneths at 12 li. the hundred, for the which he hath a Bill giuen him of 336 li. and hauing occaſion to vſe money he is conſtrained to ſell the Bill for 12 li. the hundred loſſe, the queſtion is how much money he muſt receiue for this Bill?

Iuni. I conſider thus, if he deliuered 100 li. to gaine 12 li. vpon the hundred. he receiueth 112 li. for 100 li. if he giue 12 li. in the hundred, he payeth but 88 li. for 100 li. therefore I ſay by the Rule of 3 Direct, if 100 li. be 88 li. what ſhall 336 li. be?

Example.

		17	336
		34	88
295 68	li.	68	2688
XXX 00	295.	100	2688
		50	29568
		25	

I anſwere, hee is to receiue for his Bill 295 li. 17/25 parts of a pound.

Theod. You haue well done, the nert queſtion I will propound vnto you is thus; A Marchant deliuereth 421 li. for 4 yeares at 12 li. the hundred, and to receiue intereſt vpon intereſt, the queſtion is what mony he ſhall receiue at the end of 4 yeares both principall & gaine?

Iuni. In this queſtion I make 4 ſeuerall workes for the 4 ſeuerall yeres, ſaying in the firſt worke, If 100 li. principall bee 112 li. principall and gaine, what will 421 li. principall be?

Example.

Example.

Pri.	Pri. & Ga.	Pri.
li.	li.	li.
100	112	421
	13	112
	li. 2 26	842
471 | 52	471 52	421
xxx | 00	100	421
	50	47152
	25	

For the ſecond yeare, if 100 li. principall be 112 li. what ſhall 471 $\frac{13}{25}$ of a pound be?

Example.

25 li.

100	112	471 $\frac{13}{25}$			
2500		25			
		2355			
		9423			
		1			
		11788	x		64
		112	z		128
		23576	74	li.	256
		11788	xzaa 2|56|428		2500
		11788	zzzz|00		1250
		1320256	zz		625

For

For the third yeare.

Example.

Principall.	Princ. & Gai.	Princ.
li.	li.	li.
100	112	528 64/625
		625
625		2640
100		10564
62500		31686
		330064
		112
		660128
		330064
		330064
		36967168
		li. 7417
		591 14834
		29668
		62500
		31250
		15625

2
3
18
339
5712 6
68687 | 68 |
62555 | 00 |
622
6

For

For the fourth yeare.

Example.

Principall. li.	Pri. and Gaine. li.	Princ. li.
100	112	591 $\frac{7417}{11621}$
		591
15265		15625
100		1406257
1562500		781251
		47
		9241792
		112
		18483584
		9241792
		9241792
7		1035080704
x 8 0		
3 9 x		
x 3 7 5 3 5		176426
x 9 9 8 6 6 7	li.	352852
x 0 3 5 0 8 0 7	|04| 662	705704
x 5 6 x 5 5 5	|00|	1562500
x 5 6 x x		781250
x 5 6		390625

I anſwere, he ꝑ delinereth 421 li. of mony to receiue at the end of 4 yeares both ꝑincipall and gaine after the rate of 12 li. the hundꝛed intereſt vpon intereſt, muſt receiue 662 li. $\frac{176426}{390625}$ of a pound, which fraction if you reduce is 9 s. 1 Farthing & $\frac{45667}{781251}$ parts of a farthing.

Theod.

Theod. I demaund of you this queſtion, A Marchant delinereth 420 pounds at intereſt for two yeares at 7 pounds the hundred, and every yeare intereſt vpon intereſt, how much muſt hee receiue for intereſt mony?

Iuni. To worke this queſtion, I ſay by the Rule of 3 Direct.

			If 100 li. be 107 li. what 420
			2
			107
✠✠✠	40	449 40	2940
✠✠✠	00	100	4200
		5	44940

I finde he is to haue at the end of the firſt yeare 449 pounds 8 ſhillings. Now, for the ſecond yeare I ſay by the ſame rule,

	li.	li.	
	If 100	107	449 $\frac{2}{5}$
2247	100		
107	5		
15729	500	✠✠✠ 29	li. 429
22470		✠✠✠ 00	480 500
240429			

I anſwere, there is to be receiued at the end of two yeares 480 li. $\frac{429}{500}$ of a pound, from whence if you ſubſtract 420 pounds, there remaineth for intereſt mony 60 li. $\frac{429}{500}$, which fraction if it be reduced is 17 ſ. 1 d. $\frac{33}{125}$ of a peny.

Theod,

Theod. The nert queſtion I demand of you is thus: 1
A Marchant taketh 400 li. at intereſt for one yeare at 12 li. the hundred, and hee deliuereth the ſame money at intereſt for 3 moneths at 3 li. the hundred, to receiue euery 3 moneths intereſt vpon intereſt, how much ſhall he gaine at the yeares end by the ſaid 400 li?

Iuni. I muſt here make 4 ſeuerall workes, ſaying, for my firſt worke; If 100 li. gaine 3 li. what 400 li.

li.		li.
400		3
X 2 | 00 | 12		1200
X X | 00		

For my ſecond worke I ſay, If 100 li. gaine 3 li. what ſhall 412 li. gaine?

Example.

li.	li.	li.		li.	9
100	3	412			36
		3	X 2 | 36 | 12		100
		1236	X X | 00		50
					25

For my third worke I ſay, If 100 li. gaine 3 li. what ſhall 424 li. $\frac{3}{25}$ of a pound gaine?

Example.

100 li.	3	424 $\frac{3}{25}$		
25		25	1	
500		2120	2	
200		8489	X 6	li.
2500		10609	3 1 8 | 27 | 12	$\frac{9}{25}$
		3	X X | 00	
		31827	2	

For

For my fourth worke I ſay, If 100 li. gaine 3 li. what ſhall $437\frac{227}{1100}$ of a pound gaine?

Example.

100—3—$437\frac{227}{1100}$

437	x			
17500	1 7 2	li.		
75007	3 2 7	8181	13	$\frac{227}{1100}$
1000022	2 5 5	0000		
1092727	x			
3				
3278181				

I anſwere he ſhall receiue at the yeares end 450 li. 4 ſhillings 3 Farthings $\frac{189}{611}$ of a farthing, out of the which I muſt ſubſtract 38 li. which he payeth for the intereſt there, ſo that hee getteth in the ſaid Summe of 400 li. after the rate of 3 li. the hundred, for 3 moneths intereſt vpon intereſt in 12 moneths 2 li. 4 ſhillings 3 Farthings $\frac{189}{611}$ of a Farthing.

Theod. You haue well anſwered the queſtion, I wil try you with two or three other queſtions of ſeuerall varieties, and ſo leaue; the firſt is thus, A Marchant oweth 3600 pounds to pay in 3 yeares by equall proportions, that is to ſay, the firſt yeare at the end thereof 1200 pounds, the ſecond yeare at the end thereof 1200 pounds, and at three yeares end 1200 pounds: it is afterwards agreed that hee ſhall pay the whole ſumme together at the end of three yeares, paying 6 li. the

the hundred intereſt vppon intereſt euery yeare, the queſtion is how much he muſt pay at the three yeares end?

Iuni. I haue had ſeuerall queſtions of this nature, it were but the ſpending of time to worke it, you may be ſufficiently reſolued of my ability for the anſwering thereof, for it requireth the ſame forme the queſtion of 4 yeares intereſt did.

Theod. You are deceiued, for in the queſtion of 4 yeares intereſt, you were to take intereſt vpon intereſt for the whole quantity of principall money with the intereſt euery following yeare, now here you are to ſeek the intereſt for $\frac{1}{3}$ of the whole debt of the firſt yeare, and the ſecond yeare the intereſt of $\frac{1}{3}$ of the whole debt with intereſt vpon intereſt for the firſt yeares intereſt, in the third worke you are to ſeeke the intereſt of $\frac{1}{3}$ of the debt, and the intereſt vpon intereſt of the intereſt had for two yeares paſt.

Iuni. I partly vnderſtood ſo much, but now you haue ſo plainely explained the queſtion, doubt you not but I will effect the worke thereof ſufficiently at ſome time of leaſure, therefore I pray you proceed to the reſt of the queſtions that you intend to ſhew me if they differ in their nature from ſuch as I haue already learned.

Theod. My deſire is, you ſhould haue the full vnderſtanding of any queſtion that I ſhall propound vnto you, but I doubt mee you are too well perſwaded of your owne ability in your knowledge, and no men are ſooner deceiued then ſuch as are of that opinion, but neuertheleſſe I am now perſwaded, the inſtruction I haue giuen you for the working of the laſt queſtion propounded,

propounded will be ſufficient for your vnderſtanding.

Iuni. I am much bound vnto you for your furtherance and great deſire of my good, I hope I ſhall be better aduiſed hereafter, therefore I pray you proceed as you haue intended.

Theod. The next queſtion I will propound vnto you is this, A Marchant oweth 665 li. to bee payd at 3 yeares, which he will pay in ready money, ſo that his Creditor wil cut him off 10 pounds the Hundred and this intereſt vpon intereſt, the queſtion is how much he muſt pay in ready money after that rate? 3

Iuni. To worke this queſtion I ſay by the Rule of 3 Direct in my firſt worke, If 110 li. principall and gaine, be 100 li. principall, what will 665 li. bee?

Example.

li.	li.			li.
110	100	665	16	6
		100	ØØ8Ø|0|604	11
		66500	XVVI|0	
			XX	

Now for my ſecond worke, I ſay by the ſame Rule of 3 Direct, If 110 li principall and gaine be 100 li. principall, what will 604 li. $\frac{6}{11}$ of a pound bee?

Example.

li.	li.	li.		
110	100	604 $\frac{6}{11}$	27	
11		11	VI8	
			I2ØØ1	
110		604	ØØ8ØØ|0|549	$\frac{21}{121}$
110		6046	VZVXX|0	
1210		6650	XZZ	
		100	8	
		665000		

For the third worke I ſay by the ſame Rule, If 110 pound, principall and gaine be 100 li. principall, what will 549 li. $\frac{7}{121}$ of a pound be?

Example.

li.	li.	li.	
110	100	$549\frac{7}{121}$	
121		121	
110		549	
220		10981	
110		5497	
13310		66500	
		100	
		6650000	$499\frac{11}{121}$

I anſwere, if he pay the money preſently vpon ſuch conditions expreſſed, he muſt pay 499 li. 12 ſ. 5 pence $\frac{11}{121}$ of a penny, for 665 li. the principall debt which was to be payd at 3 moneths.

Theod. I demaund of you this queſtion, A Marchant oweth 350 li. to pay at 4 moneths, and the man to whom the 350 li. is due oweth vnto this Marchant 300 li. to pay at 5 moneths, each of them taking 9 li. the hundred intereſt, the queſtion is what they muſt pay each to other, and what their account will be?

Iuni. For the working or ſolution of this queſtion, I firſt ſeeke out the intereſt of both debts according to their times, the I ſubſtract their intereſts, their remainers are principall debts each to other, to begin in my firſt worke I ſay by ye Rule of 3 Compoſed, if 100 li. in

12 mo-

12 moneths gaine 9 li. what ſhall 350 gaine in 4 moneths.

Example.

li.	Mo.	li.	li.	Mo.	
100	12	9	350	4	
	100		4		
li.	1200		1400		1
350			9	£26 | 00 |	10 $\frac{6}{11}$
10	10		12600	£22 | 00 |	2
339	10		£		

Heere I find the intereſt of 350 li. in 4 moneths to be 10 li. 10 ſ. which ſubſtract out of 350 li. there remaineth 339 li. 10 ſ. of principall debt. Now for my ſecond worke I ſay by the ſame Rule, If 100 li. in 12 moneths gaine 9 pound, what will 300 li. gaine in 5 moneths.

Example.

	li.	Mo.	li.	li.	Mo.	li.
£3	1 100	12	9	300	5	300
£38 | 00 |	11 $\frac{1}{12}$	100		5		11. 5.
£22 | 00 |	4	1200		1500		388. 15
£				9		
				13500		

Heere I find the intereſt of 300 li. in 5 moneths to be 11 pound 5 ſhillings, which I ſubſtract out of 300 pound, and there remaineth 288 pound 15 ſhillings, now finding the Marchant to bee indebted 339 li. 10

ſhillings, and the other party to bee indebted vnto the Marchant 288 pound, 15 ſhillings, then doe I ſubſtract them one out of the other.

Example.

li.	s.
339	10
288	15
50	15

I anſwere, the Marchant is to pay the Sum of 50 pound, 15 ſhillings, as the example ſheweth.

Theod. It is well anſwered, I am perſwaded you cannot be ſufficiently expert in thoſe and other ſuch like queſtions, therefore I will yet propound vnto you two or three other queſtions and ſo I will leaue, though I hold you long, it will be for your profit hereafter, for you ſhall make much vſe of theſe and the like queſtions, the next that I will propound vnto you is this, A Marchant lendeth 400 Pound vpon intereſt to receiue 10 Pound preſent, the queſtion is, how long he ſhall lend his money to get 50 Pound thereby, accounting intereſt vpon intereſt?

Iuni. I doe perceiue, that 400 Pound in one yeare muſt at the yeares end bee 440 pound, principall and gaine, which I ſubſtract out of 450, and there remayneth 10 Pound.

Example. 440 li.

10

Now, I ſay by the Backward Rule of 3, If 100 pound

pound require 12 Moneths, how many moneths will 440 pound require.

Example.

Li. 100 12 — 100 12 — 1200 — 440 Mo. — 2 8/11 — 14 8/11

3 — 42 — XZØ|0|2 — 44|0|

8 — 16 — 32 — 44 — 22 — 11

Heere I finde, that as 100 Pound in 12 Moneths, gaineth 10 pound, 440 pound ſhall in 2 moneths 8/11 of a moneth gaine 10 pound, which maketh the iuſt Sum of 50 pound, then I adde 2 moneths 8/11 of a moneth to 12 moneths, and it maketh 14 moneths 8/11 of a moneth in which time, I anſwere 400 Pound ſhall gaine 50 pound, after the rate of 10 pound the Hundred intereſt vpon intereſt.

Theod. You haue truely anſwered, I now propound vnto you this queſtion, If 100 Pound in 12 moneths gaine 16 pound, in what time after the ſame rate ſhall a man double 300 pound.

Iuni. Your queſtion is briefely propounded, but yet it is the moſt difficult to my vnderſtanding of any queſtion that hath bin propounded vnto me, neuertheleſſe, I pray you giue me leaue and I will doe my beſt to anſwere your demaund, therefore to begin I ſay if 100 pound principall bee 116 li. principall and gaine, what will 300 pound principall be.

Example.

li.	li.	li.
100	116	300
		116
		1800
	li.	300
148	00 | 348	300
xxx	00 |	34800

Heere I find in one yeare 300 li. principall will bee 348 li. principall and gaine. Now I say in a ſecond worke, If 100 li. principall, bee 116 principall and gaine, what will 348 li. principall be?

Example,

Li.	Li.	Li.			
100	116	348			17
		116			34
		2088		li.	68
		348	403 | 68 | 403		100
		348	xxx | 00 |		50
		40368			25

Heere I find in 2 yeares 300 li. principall will bee 403 li. $\frac{17}{25}$ of a li. principall and gaine, then in my third worke I say if 100 li. principall bee 116 li. principall and gaine, what will 403 li. $\frac{17}{25}$ of a pound be?

Example,

Example.

li.	li.	li.			
100	116	403 $\frac{17}{25}$.			
		25			
25		2015			
100		8067			
2500		1			
		10092			
		116	22		168
		60552	384		336
	10092		11760672	468.	672
	10092		2888	60	2500
	1170672		22		1250
					625

Heere I find in 3 yeares 300 Pounds principall is became 468 Pounds $\frac{168}{625}$ of a pound principall and gaine: then in my Fourth worke I ſay, If 100 li. principall be 116 Pounds, what will 468 pounds $\frac{168}{625}$ of a pound be?

Example.

li.	li.	li.		
100	116	468	$\frac{168}{625}$	
		625		
625		23401		
100		9368		the Fraction.
62500		28086		
I		I		
18		292668		2997
221	li.	116		5994
26939		1756008		11988
339484	88	543 292668		62500
162888	00	292668		31250
822		33949488		15625
8				

I find in 4 yeares 300 li. principall is become 543 pounds $\frac{2997}{15625}$ of a pound, which is not full 600 li. therefore I ſubſtract 543 li. $\frac{2997}{15625}$ out of 600 li. and there remaineth 56 li. $\frac{11631}{15625}$ of a pound, which muſt be gained after the 4 yeares are expyred, therefore I ſeeke firſt what 543 li. $\frac{2997}{15625}$ of a pound will gaine in 1 yeare, ſaying, if 100 li. gaine 16 li. what ſhall 543 pounds $\frac{2997}{15625}$ of a pound.

Example.

Example.

li.	li.		
100	16	543	2997
			15625
142			543
7122			46875
148778	355738		62500
890937	li. 711476		78125
1337879	52 | 86 1422052		8484375
178285	00 1562500		2997
1782	781250		8487372
	390625		16
			50924232
			8487372
			135797952

Now doe I find that 543 pound, $\frac{2997}{15625}$ of a pound in 12 moneths will gaine 86 pound, $\frac{1357378}{390625}$ of a poũd, now to know in what time 543 li. $\frac{2997}{15625}$ of a pound will gaine 56 pound, $\frac{12628}{15625}$ of a pound, I ſay by the Rule of 3, if 86 pound $\frac{1357378}{390625}$ of a pound require 12 moneths, how long will 56 li. $\frac{12628}{15625}$ require?

Example

Example.

Li.	Yo.	
$86\frac{155738}{390625}$	12	$56\frac{12628}{15615}$
86		56
2343750		93750
31250008		781258
35573		1262
33949488		887628
15625		12
169747440		1775256
67898976		887628
203696928		
169747440		10651536
33949488		
530460750000		

10651536
390625

53257680
21303072
63909216
958638240
31954608

4160756250000

4475309
|88803130

AXB07878Z8 |0000| 7
838A8078 |0000|

8950618
44753090
53046075
10609215

Yére

Here I anſwere, that 300 pound lent after the rate of 16 pounds the Hundred intereſt vpon intereſt in 4 yeares 7 Moneths, $\frac{8750618}{10605215}$ of a moneth, is doubled and become 600 pounds.

Theod. It is well anſwered, I will now demaund of you one other queſtion, and ſo will proceede to the next which is Loſſe and Gaine: the queſtion to bee demanded is thus, A Marchant hath bought a Farme for 1600 Pounds, to bee paid at 3 yeares in 4 moneths of May each time 400 pounds, in the end it is agréed betwéene that it ſhall be paid at one payment cutting off intereſt vpon intereſt in euery 18 pounds 1 pound, the queſtion is how much ready money muſt be paid? 7

Iuni. I conſider there muſt bee two payments in the moneth of May, the firſt yeare whereof I take the firſt to be in ready money, The ſecond 12 moneths after, the third two yeares after, the fourth three yeare after: then for my firſt worke I ſay, If 19 li. become 18 li. what ſhall 400 li. be?

Example.

			XII		
19	18	400	XVIII		
		18	4778	li.	
		3200	7200	378	$\frac{12}{19}$.
		400	XVIII		
		7200	XX		

For

For my ſecond worke.

19 18
19
171 7200
19 18
361 57600
7200
129600

378 18/19
19
3402
3788
1
7200

The ſecond Way.

38 3 Way.
2821
3131 li.
X2980|359 1/361.
3811X
386
3

For my third worke.

19 18
361
19
3249
361
6859

Example.

359 1/361
361
359
21541
1077
129600
18
1036800
129600
2332800

X
33
2787
8874 li.
233280| 340 740/6859.
88988
8888
88

Fourth Way.

400 li. Firſt Way.

I anſwere, 1600 li. to bee payd with ſuch conditions as you haue expreſſed, will be payd with 1477 li. $\frac{451911590}{470135803}$ parts of a pound in ready money, according to your demaund.

Theod. You haue well done, I will now leaue to trouble you with any more ſuch queſtions, doubt you not but the experience you haue had in working thoſe ſeuerall queſtions of intereſt, will giue you ſuch a light to the reſt that followeth; that it ſhall be very eaſie to your vnderſtanding. I will now propound vnto you diuers queſtions of loſſe and gaine, in which queſtions, there are but 4 ſeuerall varieties, the firſt ſhall bee ſuch queſtions as are vſed in buying and ſelling without time, the ſecond manner of loſſe and gaine, is to know what is gotten or loſt in the Hundred pound of money when the commodity is ſolde, to be payd at a certaine time, or contrarywiſe to know at what rate you ſhall ſell your commodity, either for ready money or time, to get ſuch a certaine rate vpon the Hundred Pounds worth as you intend to ſell it for, the third is, if you ſell a commodity, where vpon you know what your certaine gaine is, and would know certaine what it is in a Hundred Pounds worth after the rate, the fourth manner is, if you buy or ſell any commodity vpon ſeuerall daies, and would know certainely what your profit or loſſe is, certainely in the 100 Pound by the yeare after that rate, I will propound vnto you ſeuerall queſtions of euery manner, the firſt ſhall bee of buying & ſelling for ready money, or without time.

Queſtions

Queſtions of Loſſe and Gaine.

THe firſt queſtion demaunded is thus, A Marchant buyeth a parcell of hollands at 2 ſhillings 7 pence the Elle, and ſelleth the ſame againe for 3 ſhillings 1 d. the Elle, what doth hee gaine in 100 pound after that rate?

Example.

d.	d.		li.	
31	37	100	21	li.
	100		3 2	
			ø ø 1	
	3700		3 7 ø ø	119 $\frac{11}{31}$
			3 1 1 1	
			3 3	

Iuni. I anſwere, if one Elle of Holland coſt 2 ſhil. 7 pence, and is ſold for 3 ſhillings 1 penny, there is gained in 100 li. after that rate 19 li. $\frac{11}{31}$.

Theod. The next is thus, If one Elle of Cleath coſt 8 pence, and is ſold for 6 pence, what is there loſt in 100 li. after that rate?

Example.

Example.

			A		100
8	6	100	800		75
		6	88		
		600	*facit.*		25 li.

Iuni. I anſwere, If one elle of cloath coſt 8 pence, and is ſold for 6 pence, there is loſt 25 pound in 100 Pounds.

Theod. This ſhall ſuffice for this firſt manner of Loſſe and Gaine, onely I will propound vnto you 3 or 4 queſtions, with their ſolutions, which you may worke at your leaſure and ſo proceed further.

If a cloth coſt 24 pound, and the ſame is ſold againe for 25 pound, how much is there gotten in 100 pound, ſay

If 24 be 25, what 100 *facit.* 4 pound $\frac{1}{6}$

A Marchant ſelleth 400 Pounds worth of Pitch, wherein he hath gained 80 pound, how much doth hée gaine in a 100 pound? ſubſtract 80 out of 400 pounds, there remaineth 320 pound, then ſay. 2

If 320 pound gaine 80 li. what 100 li. *facit.* 25 li.

If 5 pound of ware coſt 8 pence, and there is 6 li. ſold for 10 pence, what is there gotten or loſt in 100 pound after that rate? ſay.

If 5 li. coſt 8 pence, what 6 li. *facit.* 9 ſ. $\frac{1}{5}$ ſ.

Then ſubſtract 9 pence, $\frac{1}{5}$ out of 10 pence, there remaineth $\frac{4}{5}$, then ſay by the Rule of 3, if 9 pence $\frac{1}{5}$ gaine $\frac{4}{5}$ what 100 *facit.* 4 pound $\frac{1}{6}$. Wée will now proceed to the ſecond manner of Loſſe and Gaine, the firſt queſtion is thus. A Marchant hath 2 ſorts of Rye, that is 10 Laſt at 28 pound the Laſt, and 15 pound at 3 30 li.

30 pound the Laſt, how ſhall hée ſell one Laſt with the other, to gaine 10 pound the hundred in the yeare.

Iuui. To worke this queſtion I caſt vp 10 Laſt at 28 pound, and 15 Laſt at 30 Pound, and adde their values together.

Example.

At 28 li. what 10, at 30 li. what 15.

10	15
280	150
450	30
730	450

Now, I ſay by the Rule of 3, if 25 Laſt coſt 730, what one Laſt?

Example.

Laſt.	li.	Laſt	z	li. 1
25	730	1	885	29
			880	
			885	
			z	5

Now, I ſay by the ſame Rule, if 100 pound principall be 110 Pound principall and gaine, what will 29 pound $\frac{5}{25}$ principal be?

Example.

Example.

100	110	29 1/5			
5		5	X		3
500		146	X686	0	32 15/16
		110	500	0	25
		1460	5		
		146			
		16060			

I anſwere, he is to ſell his Rye one with the other for 32 pound 15/16 of a pound the Laſt, to gaine 10 pound vpon the 100 pound in a yeare.

Theod. It is well anſwered: the next queſtion I will propound vnto you is thus.

If 12 Barrels of Beere coſt 3 li. 10 ſhillings, how ſhall it be ſold that there be no more then 7 pounds the hundred loſt by it. 4

Iuni. To worke this queſtion, I ſubſtract 7 pounds from 100 pounds and there remaineth 93 pound, then I ſay by the Rule of 3, if 100 pounds be 93 li. what ſhall 3 li. 10 s. be?

Example.

100	93	70			s.	
	70		65	1 0	65	1/10
	6510		00	0 0		

I anſwere, if 12 Barrels of Beere coſt 3 pound 10 ſhillings, and are ſold for 3 pounds 5 ſhillings 1/10 of a ſhilling, there is loſt 7 li. in 100 pounds.

Theod. You haue well done, and this ſhall ſuffice for this ſecond manner of loſſe and gaine, onely I will giue you a queſtion or two with their ſolutions, which

you may meditate on at your pleaſure, and ſo proceed to the third manner of loſſe and gaine.

5 If a laſt of Herring coſt 12 pounds, how ſhall I ſell them to get 8 li. the hundred ſay li.

If 100—108—12 *facit* 12 $\frac{24}{25}$.

6 If a Barrell of Sope coſt 17 ſhillings, wherin there is 10 pound the hundred gotten, what ſhould you haue payd in ready money, ſay.

If 110 be 100, what 17 *facit*. 15 ſ. $\frac{5}{11}$.

This ſhall ſuffice, we will now proceed to the third manner of loſſe and gaine, the firſt queſtion I will propound vnto you, is this.

7 If a laſt of Wheat coſt 28 li. ready money, how ſhall it be ſold for 4 moneths time to gaine 12 li. the hundred in 12 moneths.

Iuni. To proſecute my worke, I ſay by the Rule of 3 Compoſed, If 100 pounds principall in 12 moneths gaine 12 pounds, how much will 28 pounds gaine in 4 moneths.

Example.

li.	Mo.	li.	li.	Mo.
100	12	12	28	4
			4	
12			112	
100			12	
1200			224	
			112	
		3		
1	28	72	1344	

1344 | 1 $\frac{144}{1200}$.
1200

600 *facit*. 29 25

Theod.

Theod. It is truely anſwered, I will propound vnto you this queſtion, by three or foure ſeuerall varieties to try you, if you can giue me a ſolution in euery manner, which if you do, I will onely giue ſome other ſeuerall queſtions according to this rule, and ſo proceed further, the next manner is thus, If a Laſt of Wheat coſt 28 pound ready money, and is ſold for 29 li. $\frac{3}{17}$ of a pound to be paid at 4 moneths, what is there gotten in 100 pound in 12 moneths, after that rate. 8

Iuni. For the working of this ſecond Example, I ſay if 28 pound principall in 4 moneths gaine 1 pound $\frac{3}{17}$, what ſhall 100 pounds principall gaine in 12 Moneths.

Example.

li.	Mo.	28	li.	Mo.
28	4	1 $\frac{3}{17}$	100	12
4				100
112				1200
25		X		28
560		X 5	li.	9600
224		3 3 6 00	12	2400
2800		2 8 8 00		33600
		4		

I anſwere, as 28 pounds in 4 moneths, gaineth 1 li. $\frac{3}{17}$ of a pound, ſo 100 pound in 12 Moneths will gaine 12 pounds.

Theod. The next manner of propounding this queſtion, is thus. If a Laſt of wheat coſt 28 pounds ready money, for what time ſhall it be ſold, for 29 li. $\frac{3}{17}$ to 9

$\frac{3}{25}$ to gaine 12 pounds the hundred in a yeare.

Iuni. This manner ſeemeth to me ſomething harder then the other two before wrought, but neuertheleſſe if you pleaſe to giue me leaue I will giue a ſolution thereunto, for I perceiue it is to be wrought by the ſecond part of this Rule of 3 compoſed, therefore I will ſay thus, If 12 li. profite require 100 li. principall in 12 moneths, in how much time will $1\frac{3}{25}$ of a pound profite require, 28 li. principall.

Example.

li.	li.	Mo.	28	li.
12	100	12	$1\frac{3}{25}$	28
28		100		
96		1200		
24		28		
336		9600	x	Mo.
25		2400	336 | 00	4
1680		33600	84 | 00	
672				
8400				

I anſwere, If 12 pounds profit require 100 pounds principall in 12 moneths, 1 li. $\frac{3}{25}$ of a li. profit hauing 28 pounds principall, will require 4 moneths.

Theod. You haue done well, I am very glad you are ſo wel able to reſolue a queſtion when it is propounded in a contrary nature to that you haue learned, I will yet try you one or two wayes more by the ſame queſtion, the next is thus, If a Laſt of Wheat be ſolde for 29 li. $\frac{3}{25}$ of a pound, for 4 Moneths wherein there is 12 li.

12 li. the hundred gotten in a yeare, what coſt it in ready money?

Example.

li.	M.	li.	28.	Mo.
12	12	100	1 $\frac{1}{11}$.	4
				28
4				100
48		x		2800
25		xM	li.	12
240		MMC |00|	28	5600
96		xxx |00|		2800
1200		x		33600

Anſwere, as 12 li. profit in 12 moneths requireth 100 li. principall, ſo ſhall 1 li. $\frac{1}{11}$ of a li. in 4 moneths require 28 pounds principall.

Theod. It is well anſwered, the next and laſt manner is thus, If a Laſt of Wheat coſt 28 pounds, and is ſold againe for 29 li. $\frac{1}{11}$ of a li. for 4 moneths, what ſumme of money muſt you haue to gaine 12 pounds in a yeare.

Iuni. To this queſtion, for the ſolution thereof, I ſay thus, If 1 li. $\frac{1}{11}$ of a li. in 4 moneths require 28 li. principall, how much principall will 12 li. profit require in 12 moneths?

Example.

Li. 18		Mo.	Li.	Li.	Mo.
1 $\frac{3}{25}$.		4	28	12	12
				28	
28				96	
12				24	
56				330	
28		Li.		4	
336	33600	100		1344	
	33600			25	
	333			6720	
	3			2688	
				33600	

Anſwere, if 1 li. $\frac{3}{25}$ profit in 4 moneths, require 28 li. principall, 12 li. profit in 12 moneths will require 100 li. principall.

Theod. You haue well anſwered this, and all the reſt, it ſhall ſuffice for this manner of loſſe and gaine, onely I will expreſſe 2 or 3 ſeuerall queſtions, which you may worke at your leiſure, and ſo proceed to the 4 and laſt manner of loſſe and Gaine, the queſtions to
11 be propounded are theſe. A Marchant buyeth a Laſt of Aſhes, containing 12 Barrells for 50 li. and he ſelleth them againe for 5 li. the Barrell, to bee paid at 3 Moneths, what getteth he in 100 li. in 12 moneths after that rate, ſay.

If 50 li. in 3 moneth gaine 10 li. what ſhall 100 li. gaine in 12 moneths, *facit*. 80 pound.

12 If 1 Elle of Holland coſt 2 ſhillings 4 pence, and I ſell the ſame for 2 ſhillings 10 pence, to bee paid at 4 moneths

4 Moneths, what is there gained in 100 li. in 12 Moneths after that rate, ſay.

If 2 ſhillings 4 pences in 3 Moneths gaine 6 pence, what ſhall 100 li. gaine in 12 Moneths, *facit.* 64 li. $\frac{2}{3}$ parts of a ſhilling.

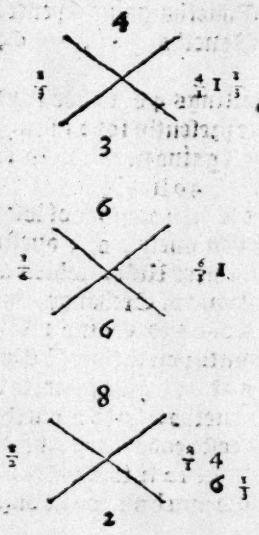
If 1 li. of Saffron coſt 19 ſhillings 4 d. to bee payd at 3 moneths, and ſell the ſame preſently for 21 ſhil. 3 pence, ready money, what doe I gaine in 100 li. in 12 moneths after that rate, *facit.* 49 li. $\frac{73}{174}$. 3

Wee will now proceed to the fourth manner of loſſe, wherein I will propoſe vnto you onely 2 or 3 queſtions, and ſo proceed further to the next Rule, which as it followeth in order, are queſtions of Exchange, but firſt to this fourth manner of Loſſe and Gaine: The firſt queſtion I will propound vnto you is thus. A Marchant ſelleth 12 broad Clothes at 14 li. the peece, to be paid $\frac{1}{3}$ at 4 moneths, $\frac{1}{3}$ at 6 moneths, $\frac{1}{3}$ at 8 moneths, his price being as the Clothes coſt ready money, hee deſireth to gaine but after the rate of 12 li. the hundred in 12 moneths, the queſtion is, how much money he ought to haue for his Clothes, 14

Iuni. To Reſolue this Queſtion, I firſt ſeeke by Practiſe what the Clothes doth Amount vnto, then doe I ſeeke by the Rule of payment when the Money ſhould bee payd, If it were to be paid all at one payment.

Example.

At 14 Pound, what 120 peeces.



120
14
480
120
1680 li.

Here I finde that the 120 peeces of Cloth at 14 li. the peece are woꝛth 1680 pound, and if the money that is to be paid foꝛ them at the rate of 12 li. the hundꝛed in the yeare, were to be paid all at one paiment, it ſhould be payd at 6 moneths $\frac{1}{2}$ of a moneth, therefoꝛe I now ſay by the firſt part of the Rule of 3 compoſed, If 100 li. in 12 moneths gaine 12 li. what ſhall 1680 li. gaine in 6 moneths $\frac{1}{2}$?

Example.

Example.

li.	Mo.	li.	li.	Mo.	19
100	12	12	1680	$6\frac{1}{3}$	
	100		19		
	1200		15120		
	3		1680		
	3600		31920		
	2		12		
	12		63840		
1	36		31920		
254	72		383040		
383040 |	$106\frac{144}{160}$				
366600 |	180				
33	90				
	30		1680		
	5		$106\frac{2}{5}$		
			$1786\frac{2}{5}$		

I anſwere, the whole valued price of 120 peeces of cloth at 14 pound the peece, with profit after the rate of 12 pounds the hundred to be payd $\frac{1}{3}$ at 4 moneths, $\frac{1}{6}$ at 6 moneths, and $\frac{1}{2}$ at 8 moneths, is 1786 pound 8 shillings.

Theod. Seeing you haue ſo perfectly anſwered this queſtion, I will onely propound vnto you, one or two more of this manner, which I will leaue to be wrought at your leaſure, and ſo proceed to the next Rule, the firſt I will propound vnto you, is this.

15 A Marchant hath bought Weale for 27 li. ready Money, and hee ſelleth it againe for 30 li. to bee payd the $\frac{1}{3}$ at 3 moneths, and $\frac{1}{2}$ at 4 moneths, what doth hee gaine in 100 li. in 12 moneths after that rate. Firſt ſeeke by the rule of payment when it ought to be payd, If hee would pay it all at one payment, and you ſhall find it to be payd it at 3 moneths & $\frac{1}{2}$, then by the Rule of 3 compoſed, ſay.

If 27 li. principall in 3 moneths $\frac{1}{2}$ gaine 3 Pound, what will 100 li. gaine in 12 Moneths? *facit.* 19 pound $\frac{3}{27}$.

16 The next queſtion is thus, A Marchant buyeth Wheat for 48 li. the Laſt ready money, and he ſelleth the ſame againe for 54 li. the Laſt, to pay $\frac{1}{4}$ part ready money, $\frac{1}{2}$ at 5 moneths, and the reſt at 7 Moneths, what gaineth hee in 100 li. in 12 Moneths after that rate, heere you ſubſtract 48 li. the principall, out of 54 li. the principall & gaine, and find there is gained 6 li. upon a Laſt, then you ſeeke by the Rule of Payment, when the money were to be paid, If hee would pay all at one payment which you find to be paid at 4 moneths $\frac{1}{4}$ then you ſay by the Rule of 3 compoſed.

If 48 li. in 4 moneths $\frac{1}{4}$ gaine 6 li. what ſhall 100 li. gaine in 12 moneths? *facit.* 35 pound $\frac{5}{27}$ of a Pound.

I will now leave for the Fourth manner of Loſſe and Gaine, and proceed further to the next Rule, which is to worke queſtions of Exchange, The nature of which Rule may bee ſhewed by many variable queſtions, becauſe there are many varieties of Coyne, Waight, and Meaſure, in many ſeverall Countries,

of

of which varieties of Coyne I will firſt giue you a Table for variety of Coynes in diuers Countries, which may be ſufficient with the knowledge and reſoluing of ſuch queſtions, as I will propound vnto you for the proportionating of any Coyne whereſoeuer you are, vnto any other Countrey Coyne whatſoeuer.

A Table of the ſorts of Money what they are in each Countrey.

Iuni. LYons, they vſe Frankes, Sols, Denars, and French Crownes, accounting 20 ſ. a Franke, and 12 denars a Sols, and the Crowne at 60 Sols.

At Geanes they vſe Sols, one Ducket maketh 3 Frankes.

At Naples they vſe Duckets, Taries, and Graines, the Ducket is 5 taries, and 1 tarie is 20 Graines, but they take 6 duckets which is 30 Taries for an ounce.

A Ducket maketh 10 Carlins, and a Carlin 10 Graines, ſo that 2 Carlins is a Tarie, and 100 Graines maketh a Ducket.

At Rome they vſe Duckets, 1 Duckets is worth 12 Guylis, and a Guyle is 10 Sols.

At Venice they vſe Duckets, at 140 Sols a pece, or 24 Denars, and 1 denere is 32 Picolis.

At Millane they vſe li. ſ. d. of Duckets imperiall a Crowne, in exchange is worth 4 li.

At Lucques, Florence, and Ancone, they vſe the Crowne of Gold, the French Crowne is worth 7 li.

But

But at Bulloigne 3 li. 10 s.

In Caſtile they vſe Maruedies, the Ducket 375 Maruedies.

At Lithbone they vſe Reys, a Ducket is 400 Reys.

At Norenberg, Franckford, and other places in Germany, they vſe Cettiers, whereof 60 is a Florentine.

At Antwerpe they vſe li. s. d.

Theod. I demaund of you this queſtion, if a Doller in Amſterdam be worth 30 ſtiuers, and in Danſke it is worth 33 Polliſh groſſes, how many Polliſh gilders of 30 groſſes the pece will make 670 gilders Flemiſh.

Iuni. To worke this queſtion, I ſay if 30 ſtiuers in Danſke be 33 Polliſh groſſes, what will 670 Gilders be?

Example.

Sti.	Pol.	Gil. Fle.
30	33	670
		20
		13400
		33
		40200
		40200
		442200

X X X		X I		Pol. Gil.
4 4 2 2 0	0	X 4 7 4	0	491 $\frac{1}{3}$.
3 3 3 3 3	0	3 3 3	0	

I

I anſwere, a Dollor in Amſterdam that is worth 30 ſtiuers, and in Danske it is worth 33 Pollish groſſes, by that rate I find 670 Gilders Flemish are worth 491 $\frac{1}{11}$ Pollish Gilders, that are valued to 30 Pollish groſſes the gilder.

Theod. You haue well anſwered, the next queſtion I will propound vnto you is thus. A Marchant in Danske giueth 9 $\frac{1}{4}$ ſmall markes for to receiue gilders at Amſterdam, 6 gilders for euery marke, the queſtion is how much he ſhall receiue in Amſterdam for 465 ſmall markes.

Iuni. To worke this queſtion, I ſay if 9 $\frac{1}{4}$ ſmall markes be 6 gilders, what 465 ſmall markes.

Example.

37				2		
9 $\frac{1}{4}$	6	465	2	33	Gil.	
		6	XXX	60	30	$\frac{33}{37}$.
		2790	37	77		
		4		33		
		11160				

I anſwere, if 9 $\frac{1}{4}$ ſmall markes be worth 6 gilders, 465 ſmall markes are worth 201 $\frac{33}{37}$ ſmall marks after that rate.

Theod. You haue truely anſwered, I will now propound vnto you this queſtion, A Marchant in Amſterdam giueth 700 gilders in exchange for Danske at 133 Pollish groſſes, for 6 gilders.

How

how many pollish gilders of 39 groſſes the peece, ſhall he receiue for the ſame in Danske.

Item. To proſecute my worke, I ſay if 6 gilders bee 133 groſſes, how many groſſes is 700 gilders.

Example.

6	133	700			
		133			Groſſe.
		2100	3	44	2
		2100	93100	15516 4/6	
		700	66666		3
		93100			

I find in my firſt worke 15516 groſſes 4/6 of a groſſe, now I ſay in my ſecond worke, if 30 groſſes be 1 gilder, how many gilders is 15516 groſſes 4/6.

Example.

		46550	
30	1	15516 4/6.	
3		Pol. Gilder.	
90		462	
		46550	517 2/3.
		990	

I anſwere, 700 Gilders in exchange for Danske, at 133 Pollish groſſes for 6 gilders, yeeldeth 517 2/3 Pollish gilder at 30 groſſes the gilder.

Theod. It is well anſwered, I demaund of you this queſtion, A Marchant in Amſterdam deliuereth money by exchange for Danske, to receiue 133 Pollish groſſes for fiue gilders Flemish, how many Gilders Flemish

Flemiſh ſhall he pay in Danske to receiue 517 ½ polliſh Gilders.

Iuni. To proſecute my worke, I ſay if 133 polliſh groſſes be 6 gilders Flemiſh, how many Flemiſh gilders are 517 ½ Polliſh gilders.

Example.

	4655		344	
133	6 517 ½.		69	parts of gilder.
9			498	133
1197	27930		5299	
			27930	| 23 199/1197
			2299	
			229	399

133			23	
30			30	
3990	3990	| 10	700	Fle. Gilders.
	3999			
	39			

I anſwere, If 133 Polliſh groſſes bee 6 gilders, Flemiſh 517 ½ Polliſh gilders are 700 Flemiſh gilders.

Theod. It is well anſwered, I will try you in the working of an example or two more; and then propoſe vnto you a few ſeuerall queſtions, with their ſolutions and ſo proceed vnto the next Rule, the firſt is thus; A Marchant deliuereth 640 Flemiſh Gilders by exchange for Rome, accounting 5 ſkiners Flemiſh for 6 Bols Turniers, what ſhall he receiue at Rome.

Iuni. To worke this queſtion, I ſay thus; If 5 ſkiners

ſtiuers Flemiſh be 6 Sols French, what ſhall 460 Flemiſh gilders be?

Example.

Sti.	Sols.	Gil.
5	6	460
		20
	Sol.	9200
55200 |	11040	6
55555		55200

I anſwere, If 5 ſtiuers Flemiſh be worth 6 Sols Tournois, 460 gilders Flemiſh are worth 11040 Sols Tournois.

Theod. Yet one other queſtion, A Marchant in Amſterdam receiueth a Bill of Exchange from Kouengſberghen of 682 Polliſh gilders to pay for 132 Polliſh groſſes 6 gilders Flemiſh, how much ſhall hee receiue in Amſterdam.

Iuni. To worke this queſtion, I ſay if 132 Polliſh groſſes be 6 gilders Flemiſh, what will 682 Polliſh gilders be?

Example.

			3		
132	6	682	3 3 9		Flem.
		30	x 2 2 7 6 0	930	
		20460	x 3 2 2 2		
		6	x 3 3		
		122760	x		

I

I anſwere, if 132 Pollish groſſes be 6 gilders Flemiſh, 682 Pollish gilders are 930 gilders Flemiſh.

Theod. I doubt not but this will be ſufficient for your inſtruction in this Rule, I will onely propoſe vnto you a few other queſtions, with their ſolutions, and ſo proceed to the nert Rule, the firſt is thus. A Marchant in Amſterdam deliuereth Mony by exchange for Franckford 55 ¼ d. Flemiſh for 65 Centſers, and from thence he deliuereth the ſame money by exchange, for Lions at 92 ¾ Centſers for a Crowne containing 54 ¾ Sols Tournois, what maketh he of his money from Amſterdam to Lyons, ſay.

If 65 Centſers at Frankford be 55 ¼ pence Flemiſh at Amſterdam, what are 92 ¾ Centſers at Frankford *facit*. 78 $\frac{\text{X}2\ 1}{10\ 40}$ Fle.

Againe, If 45 ¾ Sols Tournois be 78 pence, $\frac{87\ 1}{10\ 40}$ Flemiſh, what 45 Sols Tournois? ſo much is the Crowne ready money, *facit*. 77 d. $\frac{3\ 7\ 1\ 9}{3\ 1\ 7\ 2}$ Flemiſh out of the which ſubſtract 55 ¼ d. Flemiſh, and there remaineth 22 pence $\frac{8\ 1\ 7}{7\ 8\ 9}$ Flemiſh, ſo much hath he gotten by the exchange.

A Marchant in London deliuereth 500 pounds ſterling for Antwerpe at 23 ſhillings 5 pence the pound, what Flemiſh money muſt he receiue, ſay.

If 1 li. be 23 ſhillings 5 d. what 500 pounds, *facit*. 585 li. 8 ſ. 4 d.

A Marchant at Amſterdam taketh vp Money at intereſt for Hambrow, at 31 ſhillings lubs for 30 ſtiuers the Dollor, with the ſame money he buyeth Princes Dollors, at 35 ſtiuers the peece, and he ſendeth them to Hambrow for to pay his bill of exchange, and he payeth his Princes out for 36 ſhillings Lubs,

the queſtion is what hee loſeth or winneth in the 100, accounting 1 ¼ the hundred, for the charge of carrying the money, ſay.

If 30 ſtiuers bee 31 ſ. Lubs, what ſhall 35 ſtiuers be? *facit.* 36 ſ. ⅙ Lubs.

Then ſay againe, If 36 ſ. ⅙ Lubs be 36 ſ. Lubs ready money, what ſhall 100 be? *facit.* 99 $\frac{117}{217}$ which ſubſtract out of 100 there remaineth $\frac{100}{217}$, whereunto adde 1 ¼ it maketh 1 $\frac{617}{868}$, and ſo much is there loſt in 100.

A Marchant in Amſterdam deliuereth 100 pounds Flemiſh by exchange for Danske, at 134 Polliſh groſſes for a pound Flemiſh, and from thence he deliuereth the ſame money for Hambrow, to receiue at Hambrow for 100 Dollors 102 ⅓ Dollors, and from Hambrow hee deliuereth the ſame money for Amſterdam at 30 ſhillings Lubs, which at Hambrow is a Dollor, for 30 ſtiuers ⅓, the queſtion is what he winneth or loſeth by that exchange? ſay,

If 1 li. Flemiſh be 134 Polliſh groſſes, what ſhall 100 li. Flemiſh be? *facit.* 406 $\frac{2}{17}$ Dollors.

Then ſay, If 100 Dollors be 102 ⅓, what ſhall 406 $\frac{2}{17}$ be? *facit.* 416 $\frac{7}{153}$.

Then ſay, If 1 Dollor be 30 ſtiuers ⅓, what is 416 $\frac{7}{51}$ Dollors? *facit.* 105 li. 15 ſ. 8 d. $\frac{1}{17}$ Fle.

A Marchant deliuereth at Antwerpe 700 li. Fle. to receiue for euery 23 ſ. 4 d. Flemiſh 20 ſ. ſterling; what Engliſh money ſhall he receiue at London? ſay.

If 23 ſ. 4 d. Flemiſh be 20 ſ. ſterling, what ſhall 700 li. Flemiſh? *facit.* 600 li. ſter.

There is money taken vp in Antwerpe at 19 ſ 4 d. Flemiſh, to pay for the ſame 20 ſhillings ſterling in London,

London, and the day being come, the party is conſtrained to returne the ſame money againe to pay the Bill, and for each 20 ſ. ſterling there muſt be 19 ſ. 6 d. paid in Antwerpe: The queſtion is what hee loſeth in the 100 li. ſay.

If 19 ſ. 6 d. be 19 ſ. 4 d. what ſhall 100 pounds be? *facit.* 99 li. $\frac{3}{117}$, which ſubſtract out of 100 pounds, there remaineth $\frac{100}{117}$ of a pound, which is 17 ſ. $\frac{1}{13}$.

A Marchant deliuereth in London 500 li. ſterling at 5 ſ. 6 d. the Crowne, to receiue at Paris 50 Sols tournois for a Crowne, I demaund how much French money payeth the ſaid 500 li. ſay.

If 50 Sols Tournois be 5 ſ. 6 d. ſtarling, what ſhall 500 li. ſterling be? *facit.* 4545 Liuers 9 Sols $\frac{1}{11}$.

A Marchant deliuereth in Briſtow 180 pounds ſterling, to receiue in Lisbone, for euery 5 ſ. 6 d. ſterling a Dollor of 374 Maruedies, how many Maruedies muſt he receiue at Lisbone? ſay.

If 5 ſ. 6 d. ſterling be 374 Maruedies, what will 189 li. ſterling be? *facit.* 244800.

A Marchant in Biskey deliuereth 30000 Maruedies to receiue in London 5 ſ. 6 d. ſtarling for each Ducket, of 374 Maruedies, how much ſterling money ſhall he receiue for his 30000 Maruedies? ſay.

If 374 Maruedies be 5 ſ. 6 d. ſterling, what 30000 Maruedies? *facit.* 22 li. $\frac{11}{187}$.

Queſtions of carrying Marchandize by Land.

Theod. I Demand of you this queſtion, if a man pay for the Carriage of 24 Hundred waight 28 Miles 20 ſ. what ſhall hee pay for the carriage of 40 hundred waight 49 miles?

Iuni. To worke this queſtion, I ſay by the firſt part of the Rule of 3 compoſed, If 24 hundred to be carryed 28 miles coſt 20 ſ. what will 40 hundred coſt to be carried 49 miles?

Example.

C.	Mi.	ſ.	C.	Mi.
24	28	20	40	49
2 4	28			40
8 7				1960
62 56	192			20
5744 ſ. 112	48			39200
392000 58 $\frac{114}{171}$	672			
6722 336				
67 168				
22				

I anſwere: as 24 Hundred waight to bee carried 28 myles,

miles, doth coſt 20 ſ. ſo 40 hundred waight to be carried 49 miles, will coſt 58 ſ. $\frac{7}{13}$ which is 4 d. neareſt.

Theod. It is well anſwered, let me now demand of you this queſtion, A Marchant buyeth a Laſt of Rye at Amſterdam for 34 pounds Flemiſh the Laſt, and hée ſendeth it to London, the fraught and charge whereof commeth to 8 pounds Flemiſh; the queſtion is, the exchange being at 33 ſ. 4 d. Flemiſh the pound ſtarling, what the Laſt of Rye ſtood him in at London?

Iuni. To worke this queſtion, I adde 8 li. to 34 li. which maketh 42 li. then I ſay if 33 ſ. 4 d. Flemiſh be 20 ſ. ſtarling, how much ſtarling money is 42 pound Flemiſh.

Example.

		ſ.	li
34			
8	33 ſ. 4 d.	20	42
42	12		20
	66		840
	334		12
	400		1680
			840
			10080
			20
2 C X C	00	50 4	201600
A A A	00		
		25 4 0	

I anſwere, a laſt of Rye that ſtandeth in 42 li. Flemiſh, when the exchange goeth at 33 ſ. 4 d. Flemiſh for 20 ſ. ſtarling, it is then worth 25 li. 4 ſ. ſtarling

money.

Theod. It is anſwered truely, I will onely propound vnto you two or three queſtions more to bee wrought by you, and then I will propound ſome other queſtions according to this Rule, with their ſolutions to be wrought at your leaſure, and ſo proceed vnto the next Rule: the next Rule that followeth is thus. A Marchant buyeth Linnen cloth for 30 ſhil. the peece containing 40 elles, which he ſendeth vnto Paris, and payeth for the charges thereof 18 d. a peece, the queſtion is what the peece ſtandeth him in at Paris, accounting the exchange 6 ſhillings the Crowne, and each Crowne is 60 Sols Tournois, and euery Sols is 12 Deniers.

Iuns. To proſecute my worke, I adde 18 d. to 30 ſ. then I ſay by the Rule of 3, if 6 ſ. ſtarling be 60 ſols, what is 31 ſ. 6 d. ſtarling.

Example.

30		ſ.	Sols.	ſ.	d.
1	6	6	60	31	6
31	6	12		12	
		72		62	
				316	
				378	
		Sols.		60	
22680		315		22680	
7222		Li.			
77	15	15 Sol.			

I anſwere, a peece of Holland y ſtandeth him in 31 ſhilling

thil. 6 d. ſterling, when the exchange goeth 6 s. for a crowne of 60 ſols, the ſame peece is worth 15 liners, 15 ſols in Paris.

Theod. The next queſtion I will propound vnto you, is thus. A Marchant at Roane buyeth Spice at 9 Frankes the pound, and euery Franke 20 Sols french money, he ſendeth it for Amſterdam, and payeth for the charges thereof 1 Sols, and the exchange from Roane to Amſterdam is 60 Sols for a Crowne, at the value of 10 s. Flemiſh, the queſtion is, what they doe coſt him in Amſterdam in Flemiſh money, and what it is ſterling money.

Iuni. To worke this queſtion, I multiply 9 Franks by 20, and adde in 1 which I find to be 181, then I ſay, if 60 Sols French money be 10 s. Flemiſh, what 181 Sols French.

Example.

So.	s.	Fle.	So.
60	10		181
			10
181	0	s	1810
6 6	0	30 1/6 Fle.	

Now to put Flemiſh money into ſterling money, I ſay, if 5 s. Flemiſh be 3 s. Engliſh, what is 30 1/6 thil. Flemiſh.

Example.

181

			2			1
5	3	30 1/6	5 4 3	18	1/35	
6/35		543	3 3 0		10	

Anſwere, 9 Franks 1 ſols after 60 ſols for 10 ſ. Flemiſh, by exchange is 30 ſ. $\frac{1}{2}$ Flemiſh, and 30 ſ. $\frac{1}{2}$ Flemiſh is 18 ſ. $\frac{1}{2}$ ſtarling.

Theod. I will now onely propound vnto you two or 3 other queſtions to be wrought at your leaſure, with their ſolutions, and ſo proceed to the nert Rule: the nert that ſhall follow is this, A Marchant in London buyeth 448 li. of Cinnamon, at 4 ſ. the pound, which he ſendeth to Denſke, whereof all the charges amounteth vnto 8 ſ. ſtarling, the exchange from London to Danske is 135 Pollish groſſes, for a Dollor of 30 ſtiuers which is 3 ſ. ſtarling: the queſtion is what it will ſtand him in a pound Danske money: ſay by practiſe at 4 ſ. the pound, what 448 pound, and adde thereto 8 ſ. for charges, *facit.* 90 li. 0 ſ. 0 d.

Then ſay, If 3 ſ. ſtarling be 135 Pollish groſſes, what 90 li. ſtarling, *facit.* 8100

Then ſay, If 448 li. coſt 8100 groſſes, what ſhall 1 li. coſt? *facit.* 176 Gro. $\frac{1}{2}$

Againe, A Marchant buyeth Sugar at London for 8 d. the pound, and ſendeth it to Amſterdam whereof the charges riſeth to 1 d. the pound, if hee haue 1000 pound waight at that rate to be tranſported, the queſtion is what it will ſtand him in in Amſterdam, the exchange being 33 ſ. 4 d. for 20 ſhillings ſtarling: adde vnto 8 pence one peny which maketh 9 pence, then ſay by practiſe, at 9 pence the pound, what 1000 pound *facit.* 37 li. 10 ſ.

Then ſay, If one pound ſtarling be one pound $\frac{1}{2}$ Flemiſh, what will 37 pounds 10 ſhillings ſtarling be? *facit.* 62 li. 10 ſ.

Then ſay, If 1000 pound waight be 62 pounds 10 ſhillings

ſhillings Flemiſh, what will 1 pound be, *facit.* 1 ſ. 3 d. Flemiſh.

A Marchant at London taketh 400 pounds at intereſt at 12 pounds the hundred in the yeare, for the which money hee buyeth Carſies at 20 ſhillings the peece, and ſendeth them to Hamborow, and payeth for the charges thereof 20 ſhillings, and there hee ſelleth the peece for 18 Dollors, with the which hée buyeth Spice for 4 Dollors the hundred waight, and that hée ſendeth to Danske, for the which hée payeth for charges 4 Dollors, there hée ſelleth it for 12 Polliſh gilders the hundred waight, at 132 Polliſh groſſes for 20 ſhillings Flemiſh: now when hee hath payd his money againe with the intereſt thereof for 6 monethe, I demaund what hée winneth or loſeth by that money? firſt ſubſtract one pound from 300 which hee payeth for charges to Hamborow, there remaineth 299 pound.

Then ſay, if 20 ſ. buy one peece of Carſie, how many peeces will 299 pounds buy? *facit.* 299 peeces.

Then ſay, if one peece be ſolde for 18 Dollors, what are 299 peeces worth? *facit.* 5382 Dollors, out of the which you muſt ſubſtract 4 Dollors for charges, there remaineth 5378 Dollors.

Then ſay, if 4 Dollors buy 100 pound waight of Spice, how many pound will 5378 Dollors buy? *facit.* 134450 li. waight.

Then ſay, if 100 pound waight of Spice be ſold for 12 Polliſh gilders, how many gilders are 134450 li. waight worth? *facit.* 16134 Gil.

Now, if 132 Polliſh groſſes bee for 20 ſhillings Flemiſh, 20 ſhillings Flemiſh being 6 gilders, 22 groſſes

groſſes muſt néeds make a pollish gilder, therefore multiply 19134 pollish gilders by 22, to conuert them into groſſes, and then ſay,

If 132 Pollish groſſes bee 20 ſhillings Flemiſh, what 354948 groſſes *facit.* 53780 ſhil. Flemiſh, now multiply your Flemiſh ſhillings by 3, and diuide by 5, you ſhall finde 32268 ſhil. ſterling, which is 1613 pounds 8 ſhil. ſterling, now ſay.

If 100 pounds in 12 moneths gaine 12 pounds, what ſhall 300 pounds gaine in 6 moneths, *facit.* 18 pounds, now ſubſtract 300 pound the principall money you toke vp, and 18 pounds which you muſt pay for intereſt, which in all is 318 pounds, out of 1613 li. 8 ſhillings, and you ſhall find there is gained 1295 li. 8 s. ſterling money.

Iuni. I giue you great thankes for your paines, I doubt not but this will be ſufficient for my inſtruction in this Rule, and for thoſe queſtions you haue laſt ſet downe to be wrought at ſome time of leaſure, you haue ſo plainely explained them, that I doubt not but I ſhal eaſily comprehend them, therefore I pray you proceed to the next Rule that followes.

Theod. I will ſatisfie your deſire, the next Rule that followeth is the Rule of Fellowſhip, wherin there are many queſtions of ſeueral varieties to be propounded, I will trouble you with no more of them to bee wrought then I thinke moſt conuenient that you ſhall make vſe of hereafter, the reſt ſhall bee expreſſed with their ſolutions, to worke at your leaſure for your furtherance in the practiſe of Arithmeticke.

The

The Rule of Fellowſhip.

THe firſt queſtion I will propound vnto you is this. Two Marchants in company together, the one putteth in 300 li. the other 500 pounds, with the vſe of both their ſtockes there is gained 240 pounds. The queſtion is what each man muſt haue? the inſtruction to be giuen you for the ſolution of this or any ſuch like queſtion, is this: you muſt adde their layings in together, which is in the whole 800 pounds, then ſay by the Rule of 3, for your firſt worke, if 800 pound gaine 240 pound, what will 300 pounds gaine which is the firſt mans ſtocke, and the money you finde in the quotient muſt be the firſt mans gaine: then ſay in the ſecond worke, if 800 pound gaine 240 pounds, what will 500 pounds gaine the ſecond mans ſtocke, and the mony you finde in the quotient ſhall be the ſecond mans gaine: and ſo were there neuer ſo many in company you muſt make for euery ſeuerall man a ſeuerall worke, and when you haue ſo done for your ſake, adde vp all their ſeuerall gaines together, if it make iuſt the whole money that is gained, then haue you wrought truely.

Iuni. I pray you giue mee leaue to worke this queſtion propounded, you haue explained the manner

of

of the Rule ſo plainely that I ſhall eaſily by your inſtruction comprehend the working of this or any ſuch like queſtion.

Example.

300
500 800 240 300
800 300

Fir. li. 72000

720 |00|90
88|00

800 240 500

Cs. 500

li. 120000

4 li.
720|00| 150 90
888|00 150
240

I anſwere to this queſtion, the firſt man muſt haue 90 pounds profit, and the ſecond muſt haue 150 pound, which being added together for my proofe, I finde the whole gaine which is 240 pounds.

Theod. You haue well done, the next queſtion I will propound vnto you, is this. Three Marchants being in Company, the firſt layeth in 300 li. for 4 moneths, the ſecond 400 li. for 5 moneths, the third 540 li. for 6 moneths, they haue gained 248 pound, what is each mans part? Here you muſt multiply euery mans mony by his time, and then adde their ſeuerall products together, and worke as before is ſhewed.

Iuni.

Iuni. I vnderſtand the queſtion very well, If you pleaſe to giue mee leaue, I will worke the queſtion thus.

Example.

300	400	540	1200
4	5	6	2000
1200	2000	3240	3240
			6440

6440 — 248 li. — 1200

1200
49600
248
297600

I
43
488
5X26
297600 | 0 | 46 816/644
64440
64

6440 — 248 — 2000

2000
496000

I
434
7822
496000 | 0 | 77 72/644
64440
64

6440 — 248 — 3240/248

25920
12960
6480
803520

4
369
16XX
209216
803520 | 0 | 124 496/644
64440
644
6 — 248

I anſwere, he that putteth in 300 pounds for 4 Moneths muſt haue 46 pounds $\frac{336}{444}$, the ſecond man that layd in 400 pound for 5 moneths muſt haue 77 pounds $\frac{332}{444}$, the third man that layd in 540 pounds for 6 Moneths muſt haue 124 pounds $\frac{456}{444}$, which quantities of gaine being added together maketh the iuſt Summe of 248 li. the whole gaine.

Theod. You haue well done, and I doubt not but you will bee ſufficiently able to anſwere any queſtion that ſhall be propounded vnto you, either with time, or without time, I will now propound vnto you a queſtion of a contrary manner, that is thus, Three Marchants are in company, and all together lay in 560 pounds, wherewith they gaine 150 pounds, whereof the firſt taketh 40 pounds, the ſecond 50 pounds, and the third 60 pounds, the queſtion is what each man had in ſtocke?

Iuni. There is little difference as I take it, for where before you found their gaine by their ſtocke, now I am to finde their ſtocke by their gaine, therfore firſt I adde their gaines all together, and then worke as the Rule requireth.

Example.

40	150	560	40
50	X	40	
60	8	22400	
150	X 75 5	1	
	2 2 4 0 0	149 $\frac{5}{15}$	
	1 5 5 5 0	3	
	11		

150

150 560 50

50

28000

186 $\frac{1}{11}$.

150 560 60

60

33600

224

I anſwere, if 150 li. be gained with 560 li. what ſhall

40 —— *facit.* 149 $\frac{1}{11}$.
50 —— *facit.* 186 $\frac{2}{3}$.
60 —— *facit.* 224

560

Theod. It is well anſwered, the next queſtion I will propound vnto you, is thus. Three Marchants in company haue gained 498 pounds, which is to be diuided amongſt them in this ſort, that is, the firſt hath $\frac{2}{7}$, the ſecond ſhall haue $\frac{1}{2}$, and as the ſecond taketh $\frac{3}{4}$, the third ſhall haue $\frac{1}{3}$, the queſtion is what each man ſhall haue of the gaine?

Iunio.

Iuni. To worke this queſtion, I firſt ſeeke in what proportion $\frac{1}{3}$ $\frac{1}{2}$ is one to the other, then I ſeeke in what proportion $\frac{1}{4}$ and $\frac{1}{5}$ are one to the other, and thereby finde 3 numbers in ſuch proportion as $\frac{1}{3}$ is to $\frac{1}{2}$, and as $\frac{1}{4}$ is to $\frac{1}{5}$, and then worke according to the order of the Rule as hath beene before ſhewed.

Example.

2	3	24	20
$\frac{1}{3}$	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{5}$

Here I finde the firſt muſt be contained in the ſecond $1\frac{1}{2}$ of a time, therefore for my numbers I take 4 and 6 which are ſo contained, then I finde the ſecond mans portion muſt be as 6 to 5, therefore I take for my 3 numbers 4 6 5, which being added maketh 15, then I ſay by the order of the rule.

Example.

15	498	4				4	
6	4				133	$\frac{2}{15}$	
$\frac{5}{15}$	1992					5	

15	498	6				
	6					
	2988			199	$\frac{3}{15}$	
					5	

15

15 498 5 3

5 163

2490 2490 | 166

1835

XX

I ſay, if 15 require 498 Pound. { what 4 *facit* 132 16 0 / what 6 *facit* 199 4 0 / what 5 *facit* 166 0 0

498 0 0

Theod. You haue well done, I will ſée the worke of two or three more queſtions of ſeueral varieties, and then propound vnto you a few other with their ſolutions to be wrought at your leaſure, and ſo proceed to the next Rule: the next that followeth, is thus. Two Marchants in Company, the firſt put in 245 for ſixe moneths, the ſecond put in 130 Pound, and they gayned 70 Pound, whereof the firſt muſt haue 50 Pound, and the ſecond 20 pound. The queſtion is, what time the ſecond had his money in ſtocke?

Iuni. I take this queſtion to bee reſolued by the double Rule of 3, therefore I ſay in my firſt worke if 245 pound ſtocke require 50 Pound gaine, what will 130 pound ſtocke require?

Example.

			1		
			4		
245	50	130	xϐ3		
		50	27ϐ		26
		6500	ϐ5ϕ0	26	130/245
			7488		49
			24		

Now I ſay in my ſecond worke, If 26 pound 26/49 require 6 moneths, what will 20 li. require?

Example.

26 li. 26/49	6	20		
26		6		
294		120		Ms.
986		49	16	34
2		1080	588 | 0	4 68/130
1300		480	x38| 0	65
		5880		

I anſwere, if 245 pound gaine 50 pound, 130 li. ſhall gaine 26 pound 26/49, then if 26 pound 26/49 require 6 moneths, 20 pound gaine ſhall require 4 moneths 24/65 of a moneth.

Theod. You haue well done, the next that followeth is thus. Foure Marchants haue bought a Ship for 3600 pound, whereof A muſt pay 1/3 part, B 1/4 part, C 1/5 part, and D 1/6 part, the queſtion is, how much each man ſhall pay for the ſaid ſhip?

Inuen.

Item. To worke this queſtion, I reduce them into one denomination after the firſt kind of Reduction, whoſe proportions are as this Example ſheweth.

20
15
12
10
57

which numbers maketh in the whole 57, then I proſecute my worke.

Example.

57 3600 20

20

72000

57 3600 15

15

18000
3600

54000

57 3600 12

12

7200
3600

43200

57 3600 10
10
36000

3
134
893 11
38000 | 631 11/57
87777 19
88

Ianſwere, if 57 li. be 3600, what ſhall.

20	facit.	1263	3/19
15	facit.	947	7/19
12	facit.	757	17/19
10	facit.	931	11/19

Theod. The ſayd Ship hath made a voyage, and there is gotten all charges deducted, by the ſaid Ship 240 pound, what muſt each owner haue?

Iuni. I worke as before, If 57 pound require 240 what will?

Ianſwere, if 57 require 240 li.

20	facit.	84 4/19
15	facit.	63 1/19
12	facit.	50 10/19
10	facit.	42 2/19
		240

Theod. Yet a queſtion or two, and ſo wee will proceed further, the next that followeth is thus. Two Marchants in company, whereof the firſt put in 200 li. more then the ſecond, they haue together gained 150 pound, whereof the firſt taketh 100 pound, the queſtion is what each man put in.

Iuni. This queſtion is ſome anſwered, for if the firſt haue 100 pound for 50 pound, the ſecond hath of the

the gaine, and that the firſt laid in 200 Pounds more then the ſecond did, his ſtocke muſt néeds bée 400 li. and the ſecond mans 200 li.

Example.

If 50 Pound gaine muſt haue 200 Pound ſtocke, what ſhall 100 li. gaine haue?

50 200 100

200

li. 20000

2♁00|0| 400

888|0

50 200 50

50 li.

1000 1♁00|0|200

888|0

Theod. Séeing this ſéemeth ſo eaſie to your vnderſtanding, I will demaund of you this queſtion; A marchant béeing dead, weth to Thrée men 1500 Pounds, that is to ſay, to A 400 pound, to B 500 pound, to C 600 pound, and all his goods amount but to 300 li. what ſhall each man haue for his part?

Iuni. I anſwere, if 1500 pounds be 300 pound, what.

400 *facit.* 80
500 *facit.* 100
600 *facit.* 126

309

Theod. You are very expert in anſwering theſe

queſtions, I will yet try you with two or three more of ſome variable manner in worke, the firſt is thus. Two Marchants in Company, A putteth in 500 li. and at 4 moneths end he taketh out of his ſtocke 240 pound, and letteth the reſt continue in ſtocke 8 moneths longer. B putteth in 250 pound, and at 5 moneths end hee putteth in more 300 pound, and continueth the ſame in ſtocke 7 moneths; their gaine is 240 pound, how muth muſt each man haue thereof?

Example.

A				B			
500	4	Mo.	2000	250	5	Mo.	1250
240				300			
260	8	Mo.	2080	550	7	Mo.	3850
			4080				5100
			5100				
			9180				

Iuni. I anſwere, if 9180 money and time require 240, what { 4080 *facit.* 106 $\frac{14}{51}$ A ; 5100 *facit.* 133 $\frac{10}{17}$ B

Theod. I perceiue you are not doubtfull in any thing, I am very glad of your perfectneſſe, Anſwere me now to this queſtion. Two Marchants in Company, A putteth in 500 pound and at 4 moneths hée taketh out 240 pound, and letteth the reſt continue 8 moneths more. B putteth in 250 pound, and at 5 moneths end hee putteth in 300 pound more, and letteth all his money continue 7 moneths longer, and at the

the end of their account A findeth that he hath gained 106 li. $\frac{14}{17}$, the queſtion is what B hath gained?

Example.

A	500	4	Mo. 2000	B	250	5	Mo. 1250
	240				300		
	200	8	Mo. 2080		550	7	Mo. 1850
			4080				5100

Iuni. I anſwere, If 4080 $\left\{\begin{matrix}\text{money}\\ \text{\& time}\end{matrix}\right\}$ 5100 $\left\{\begin{matrix}\text{money}\\ \text{\& time}\end{matrix}\right\}$ *facit*, 133 $\frac{17}{17}$ what ſhall (B

Theod. I will try you to the vttermoſt in this Rule, for here are more queſtions of ſeuerall varieties for the diffucuty of the vnderſtanding of them, to bee propounded, then in the othr Rule, If I find you no worſe able to anſwere to the reſt that followeth then you haue yet beene, I ſhall be very glad of your ability in this Art.

Iuni. I pray you proceed as you intend, and continue them at your pleaſure, I doubt not but I ſhall reape great profit therein.

Theod. The next that ſhall follow, is thus. Two Marchants are in Company, A putteth in 300 pound, and at 2 moneths hee taketh out 100 pound, and 6 moneths after the taking out of the money hee putteth in more 250 pound, and continueth with the ſame in company till the yeares end. B putteth in 600 li. and at 4 moneths hee taketh out 200 pounds, and 3

Moneths after that firſt taking out he taketh out 150 pound more and letteth the reſt continue in Company till the yeares be out, and their gaine together is 320 pound, what ſhall each man haue thereof?

Example.

A				B			
300	2 Mo.	600		600	4 Mo.	2400	
100				200			
200	6 Mo.	1200		400	3 Mo.	1200	
250				150			3600
450	4 Mo.	1800		250	5 Mo.	1250	4850
		3600					4850 8450

Iuni. I anſwere, if 8450 money and time gaine 320 what ſhall.

A 3600 *facit* 136 $\frac{25}{169}$.

B 4850 *facit* 183 $\frac{121}{169}$

Theod. You haue well done, it is ſufficient for queſtions of that nature: The next I will propound vnto you, is thus. Two Marchants are in Company, A putteth in 400 pounds for a certaine time, and hee gaineth 50 pound, B putteth in a Sum of money for 5 moneths, and he gaineth likewiſe 50 pound, and I find that each of them hath gained 20 Pound the Hundred in the yeare; the queſtion is, how long A continued? and how much money B put into ſtocke?

Example.

Example.

100 li. 20 400
20 li.
1000 8ø'|00| 80 A
xx|00

li. Ms. li.
80 12 50
12 4 Ms. 1 A
600 øø|0|7 ½
8|0 2

Mo. li. Mo.
5 400 7½ li.
15 øøø|0|600 B
400 xxx|0
6000

Iuni. I anſwere, A continued in ſtocke 7 moneths, ½, and B put into ſtocke 600 pound.

Theod. I demand of you this queſtion, Two Marchants are in Company, B putteth in 200 li. more then A, B continueth in ſtocke 5 moneths, and A 7 moneths ½, they gaine one as much as the other: the queſtion is, what each man did put in ſeeing that they gained alike?

Iuni. To worke this queſtion, I doe conſider the firſt mans money beeing multiplyed by his time, it sheweth what it is, as alſo the ſecond mans money beeing multiplyed by his time doth the like, by the ſame reaſon it followeth, that times muſt doe the like as 5 moneths to 7 moneths ½, therefore I ſubſtract the one from the other, and there remaineth 2 moneths ½,

now

now as 2 Moneths ½ are leſſe then 5 moneths, ſo is 200 pound of B more in proportion then the ſtocke of A, therefore I ſay if 2 ½ moneths require 200 pound, what 5 moneths.

5			1000
	li.		z
2ø00 | 4 0 A			2000
ſſſ			
Mo.	li.		Mo.
2 ½	200		7 ½
5			15
2	li.		200
10 øøø | 0 | 600 B			3000
xxx | 0			2
			6000

I anſwere that A putteth in 400 pound, and B putteth in 600 pound, ſo hath B 200 pound in ſtocke more then A, as by the example appeareth.

Theod. You haue well done, the next queſtion is thus. Three are in company together, A will haue ½ of the gaine and he continueth in ſtocke 5 moneths, B layeth in likewiſe a ſumme of money for 8 moneths, C layeth in 400 pound for 7 moneths, and he taketh ⅐ of the gaine, the queſtion is how the firſt and ſecond put in.

Iuni. This ſeemeth ſomething hard to my vnderſtanding, yet neuertheleſſe to begin my worke, I ſee that C layeth in 400 pound certaine for 7 moneths, whoſe money and time I multiply together, the num-

ber

ber produced is 2800, and it is certaine that C muſt haue $\frac{1}{7}$ of the gaine, therefore I ſay if $\frac{1}{7}$ of the gaine requireth 2800 money and time, what will $\frac{1}{7}$ of ỹ gaine require for A, the number produced is 840 Money and time, which I diuide by 5 the certaine time of A, and I find that A hath in ſtocke 168 pound, then doe I adde $\frac{2}{5}$ and $\frac{1}{7}$ together, the number produced is $\frac{12}{35}$, which ſubſtract out of $\frac{1}{7}$ there remaineth $\frac{7}{35}$ for B part of the gaine, then I ſay if $\frac{12}{35}$ be 2800 Money and time, what will $\frac{7}{35}$ bee, *facit* 590. which diuide by 8 moneths the time he had his money in ſtocke, the number produced is 70 pound that B put in, and ſo is the queſtion anſwered.

Theod. You haue well done, I will now trouble you with working no more queſtions according to this, but I will propound vnto you ſome 10 or 12 queſtions more, which you may worke at your leaſure, and ſo I will proceed to the next Rule: the next queſtion that ſhall followeth is thus.

1 Three Marchants are in company, A putteth in 168 pound for 5 moneths, B putteth in a ſumme of money for 8 moneths, C putteth in 400 pounds for a certaine time, they haue gained 90 pound: whereof A muſt haue 18 pound, B 12 pound, and C 60 pound, the queſtion is, how much money B put in, and how long time C continued in company? ſay, A his money Multiplied by his time *facit*. 840, then ſay, if 18 li. for A be 840, what 12 li. for B *facit*. 560 li. which diuide by 8 moneths, it maketh for B ſtocke 70 pound: then ſay if 80 pound bee 840 pound, what 60 pound *facit*. 2800, which diuide by 400 pound his ſtocke put in it, maketh 7 moneths that C continueth in company

which

which anſwereth the queſtion.

2 Three are in Company, A and B haue together 238 pound, B and C haue together 470 li. C and A haue together 568 pound, A continueth 5 moneths in Company, B continueth 8 moneth, and C continueth 7 moneths, they haue gained together 90 Pounds; the queſtion is, how much each man hath put in, and what each man muſt haue of the gaine? Adde 238 li. 470 li. and 568 li. together, the number produced will be 1276 li. in the which ſome each mans money is twiſe nominated, therefore diuide 1276 Pound by 2 which is one leſſe then the Company, and it maketh 638 pound, the Sum of all their whole ſtocke. Out of the which ſubſtract 470 li. that B and C layd in, then there reſteth 168 pound for A that he put in, then ſubſtract 568 li. that A and C put in, out of 638 Pounds, there reſteth 70 pound that B put in, then ſubſtract 238 pound that A and B put in, out of 638 pounds, there remaineth 400 pound that C put in. Now to find out each mans gaine, Multiply their layings in by their time, and worke as before is ſhewed, and you ſhall find that their ſeuerall gaines are thus,

li.

For A *facit.*——18
For B *facit.*——12
For B *facit.*——60

3 The Third queſtion I will propound vnto you is thus. Three Marchants in Company, they haue layd in all together 638 pound, wherewith they haue gained 90 pound, whereof A taketh 18 li. and hath continued in ſtocke 5 Mo: B taketh 12 li. becauſe his ſtocke

ſtocke was in 8 moneths, and C taketh 60 li. becauſe his ſtocke was in 7 moneths, the queſtion is what each man put in? Diuide euery mans gaine by his time and adde the number produced together, which are $3\frac{1}{5}$, $1\frac{1}{6}$, $8\frac{4}{7}$, the product thereof is $13\frac{47}{70}$, then ſay as you did before according to the manner of this Rule, if $13\frac{47}{70}$, require 638, what $3\frac{1}{5}$ *facit.* 165 li. for A, then if $13\frac{47}{70}$ require 638 li. what $1\frac{1}{2}$ *facit.* 70 li. for B, Againe, if $3\frac{47}{70}$ require 938, what $8\frac{4}{7}$ *facit.* 400 li. for C.

4 Fowre in Company, whereof A B and C put in 572 pound, B C D put in 530 pound, C D and A put in 468 pound, D B and A together 521 li. A continueth 4 moneths, B 6 moneths, C 8 moneths, and D 9 moneths, they haue gained 148 pound, the queſtion is, how much each man ſhall haue for his part of the gaine, alſo how much each man put in, the 4 Summes together making 209 li. here each mans money is accounted 3 times, there diuide 2091 li. by 3 it maketh 697 li. for the whole ſtocke, for the which ſubſtract for A B C 572 li. there reſteth 125 li. for D ſtocke, then ſubſtract 530 li. for B C D out of 697 li. reſteth 167 li. for A ſtocke, alſo ſubſtract 468 li. for C D A out of 697 li. reſteth 229 li. for B ſtocke, then take out 521 li. for D B A out of 697 li. there reſteth 176 li. for C ſtocke, then hauing euery mans ſtocke ane time certaine, worke as the Rule requireth, and you ſhall find the queſtion thus.

If 4575 li. money and time, gaine 148 pound, what will.

668 *facit.* 21 $\frac{2783}{4575}$ A
1374 *facit.* 44 $\frac{5052}{4575}$ B
1408 *facit.* 45 $\frac{2509}{4575}$ C
1125 *facit.* 36 $\frac{1800}{4575}$ D

The

5 The 5 queſtion is thus, Foure Marchants haue 712 pound, which they diuide in ſuch manner that the $\frac{1}{3}$ part of A ſhall be as much as the $\frac{1}{7}$ parts of B, and the $\frac{1}{4}$ parts of B as much as the $\frac{4}{7}$ parts of C, and the $\frac{5}{6}$ parts of C as much as the $\frac{6}{7}$ parts of D: the queſtion is, how much each man ſhall haue for his part? Imagine a number wherein the parts afore ſpecified are ſet, take for A 36, whoſe $\frac{1}{3}$ part is 18 and muſt be equal to $\frac{1}{7}$ of B, then if 18 be $\frac{1}{7}$ of B, the $\frac{1}{8}$ of 18 is 9 which maketh 18 to be 27 for the whole of B: now muſt the $\frac{1}{4}$ of B be equall to the $\frac{5}{6}$ of C, $\frac{1}{4}$ of 27 is $20\frac{1}{4}$, ſo is the $\frac{5}{6}$ of C, then the whole thereof is $25\frac{5}{16}$ for C, now $\frac{5}{6}$ of C is as much as $\frac{6}{7}$ of D, the $\frac{6}{7}$ of $25\frac{5}{16}$ is $21\frac{33}{112}$, ſo is the $\frac{6}{7}$ of D, the whole of D is $24\frac{39}{64}$, which numbers you muſt adde together, and then worke according to the manner of this Rule, the product is $112\frac{59}{64}$ ſay.

If $112\frac{59}{64}$ gaine 36, 27, $25\frac{5}{16}$, $24\frac{39}{64}$
712 li. what *facit*. 226 $\frac{794}{805}$, 170 $\frac{194}{805}$, 159 $\frac{483}{805}$, 155 $\frac{133}{805}$

For proofe of this queſtion.

113 $\frac{399}{805}$ is the $\frac{1}{2}$ of A, and alſo the $\frac{1}{3}$ for B,
127 $\frac{547}{805}$ is the $\frac{5}{4}$ of B, and alſo the $\frac{4}{7}$ for C,
133 $\frac{133}{805}$ is the $\frac{5}{6}$ of C, and alſo the $\frac{6}{7}$ for D.

6 The Sixt queſtion is thus, Three Marchants fraught a Ship, wherein A hath 40 Tuns of Rye, B hath

hath 10 Tuns of Rye, and 40 Tuns of Aſhes, C hath 20 Tuns of Wheat; the ſaid Ship being at Sea by foule weather was forced for ſafegard of the Ship and goods, to throw ouer-bord 20 Tunnes of Aſhes and 4 Tuns of Wheat, the queſtion is what the loſſe is vpon 100 pounds: alſo how much each man muſt beare of the loſſe, the Rye being rated at 35 pound 10 ſhillings the Tun, the Aſhes at 10 pound the Hundred, and the Wheat at 42 pound $\frac{1}{2}$ the Tun, and the ſhip with his tackling rated at 3000 pound: you muſt firſt caſt vp the goods at the prices they are rated, then adde vp their products together, and therewith the price of the ſhip and tackling all amounteth to 6020 Pounds, whereof A hath 1420 pounds. B hath 755 Pounds. C hath 845 Pounds. The ſhip rated at 3000 pound, they caſt vp the goods caſt ouer-bord according to their parts, whereof Aſhes amounteth to 200 pound, Wheat to 169 pound, all the damage is 369 pound: then ſay if 6020 pound loſe 369 pound, what doth 100 Pounds loſſe, *facit* 6 pound $\frac{19}{301}$.

Then ſay, if 100 li. loſe 6 li. $\frac{19}{301}$ what.

1420 *facit.* 87 $\frac{12301}{19100}$
755 *facit.* 46 $\frac{6375}{10100}$
845 *facit.* 56 $\frac{23955}{30100}$
3000 *facit.* 183 $\frac{21700}{30110}$

7 The Seauenth queſtion, A Marchant hath 290 pound to put in trade of Marchandiſe, and to that end he agreeth with the Factor, that if the Factor put 70 pound into ſtocke, hee ſhall haue $\frac{1}{2}$ of the gaine: the queſtion is what is alloweth him for his paines: Say

If

if $\frac{1}{4}$ haue 390 pounds, what ſhall $\frac{1}{4}$ haue *facit.* 130 pounds out of the which ſubſtract 70 pound the Factor layd in, and there remaineth 60 pounds allowed him for his paines.

8 The Eight Queſtion, A Marchant giueth a Factor 390 pounds therewith to trade in marchandize, and the Factors paines is accounted 60 pounds, how much money muſt the Factor put in? Say, if $\frac{1}{4}$ be 390 what will $\frac{1}{4}$ bee *facit,* 130 pounds, out of the which ſubſtract 60 pounds which he hath for his paines, there remaineth 70 pounds that he muſt put in.

9 The Nynth queſtion, A Marchant hath 400 pounds to trade in Marchandize, hee agréeth with a Factor that if he put in 90 pounds to the ſtocke, then he ſhall haue the $\frac{1}{5}$ of the gaine for his paines. After another Marchant deſireth to put in 350 pounds to the ſame ſtocke and promiſed likewiſe to obſerue the ſame ſame agréement made with the Factor: at the end of a yeare they find they haue gained 250 pounds, the queſtion is how much each man ſhall haue for his part, and what the Factors paines is eſtéemed? Say, if $\frac{1}{5}$, be 400 pound, what $\frac{1}{5}$ *facit.* 200 pound out of the which ſubſtract 90 pound which hée layd in for the Factors eſtimation *facit.* 110 pound.

Then ſay if 950 pound gaine 250 li. what.	400 *facit.*	105	$\frac{5}{19}$
	350 *facit.*	92	$\frac{7}{19}$
	200 *facit.*	52	$\frac{12}{19}$

10 The Tenth queſtion, Two Marchants are in company, A putteth in 400 pound, B 650 pound, which they deliuer to a Factor, to whome they pro-

miſe

miſe for his paines $\frac{1}{6}$ of the gaine, preſently after that the Factor putteth in to company 250 pounds, and they gaine in all 240 pounds, what ſhall each man haue of the gaine? take $\frac{1}{6}$ part out of the gaine, and it maketh 40 pound for the Factors part, which ſubſtract out of 240, there remaineth 200 li, that muſt be parted amongſt them.

Then ſay, if the whole ſtocke which is 1300 li. gaine 200 li. what

400 *facit.* 61 $\frac{7}{13}$ for A.
690 *facit.* 100 for B.
250 *facit.* 38 $\frac{6}{13}$ factor.

11 The Eleauenth queſtion, A Marchant deliuereth 500 pounds to his Factor, and the Factor putteth thereto 200 pound, whereof he taketh the $\frac{1}{8}$ part of the gaine for his paines, the queſtion is what each man ſhall haue of the gaine? ſay if $\frac{7}{8}$ be 700 pound, what $\frac{1}{8}$ *facit.* 100 pounds for his paines, to which 700 li. ſtocke adde 100 pounds for his paines, all is 800 li. that is 300 pound for the Factor with his eſtimation, and 500 li. for the Marchant.

Then ſay, if 800 pounds be 1, what

300 *facit.* $\frac{1}{8}$ Factor.
500 *facit.* $\frac{1}{8}$ Mar.

12 The Twelfth queſtion, Three Marchants are in company. A putteth in 400 pounds, B putteth in 500 pound, and C 600 pounds, the ſame Money they deliuer to a Factor with promiſe to giue him $\frac{1}{5}$ part of the gaine: now when 2 moneths were paſt, the Factor put into the ſame ſtocke 3000 pound, and as they make

account for a whole yeare, it is found that they haue gained 620 pounds, the queſtion is how much the Factor is to haue for his part? alſo what each of them muſt haue. Take the $\frac{1}{5}$ part of the gaine which is 124 pounds for the Factors part, out of 620 pound gaine, and there reſteth 496 pounds, which muſt be parted amongſt the three Marchants and the Factor, then multiply their ſeuerall ſtocks by their ſeuerall times.

Example.

A	B	C		
400	500	600	300	Factor.
12 Mo.	12	12	10	
4800	6000	7200	3000	

Then adde their products together, 4800

Then ſay if 21000 gaine 496 what.

4800 *facit.* 113 $\frac{13}{37}$ A 6000
6000 *facit.* 141 $\frac{5}{7}$ B 7200
7200 *facit.* 170 $\frac{3}{37}$ C 3000
3000 *facit.* 70 $\frac{5}{7}$ 21000 (Factor.

Theod. I will now end with this, wiſhing you to make vſe of theſe queſtions at your leaſure.

Iuni. I thanke you for your great paines, I will not ſlacke time God willing, vntill I finde my ſelfe ſufficiently able to make vſe of them all, in the meane time I pray you proceed to the next Rules that doe follow, which as I haue heard you ſay, are queſtions of Barter.

Barter.

Barter the firſt kinde.

THeod. I will ſatisfie your deſire, and the firſt queſtion I will propound vnto you, is thus. Two Marchants barter, the one hath 14 hundred of Hempe at 17 pound 10 ſhillings the hundred, the other hath Clothes at 19 pounds the peece. The queſtion is how many Clothes he muſt deliuer for 14 hundred of Hempe.

Iuni. To worke this queſtion, I firſt ſeeke what 14 hundred of hempe is worth by practiſe.

Example.

At 17li. 10 s. the 100, what

	14 C
	17
	98
	147
facit.	245 li

Now muſt I ſay by the Rule of 3 direct, if 16 li. buy 1 Cloth, what will 245 li. buy?

Example.

li.	Clo.	li.	3	Clo.
16	1	245	18	15 1/16
			245	
			966	
			1	

I anſwere, that 245 pounds the valued price of 14 hundred of Hempe will buy 15 Clothes, and 1/16 of a Cloth at 16 li. the peece.

Theod. The next queſtion is this. Two Marchants barter, the one hath 15 Laſt of Rye at 30 pounds the laſt, the other hath 40 Laſt of Peaſe at 21 li. the Laſt, the queſtion is which of them muſt haue money one of the other, and how much it is?

Iuni. I firſt ſay at 30 pounds the laſt of Rye, what

15 Laſt.
30
facit. 450 li.

Againe, if 1 laſt of Peaſe coſt 21 li. what 40 laſt?

40
facit. 840 li. 840
450
390 li.

I anſwere, he that deliuereth 40 laſt of Peaſe at 21 pounds the laſt, and deliuereth 15 laſt of Rye at 30 li. the laſt, muſt alſo receiue in money to ballance the barter 390 pounds.

Theod. You haue truely anſwered the queſtion, thoſe

thoſe 2 queſtions ſhall ſuffice for the firſt manner of Bartering, the ſecond kind ſhall follow, and the firſt queſtion is thus. Two Marchants Barter, the one hath 18 hundred of Tallow at 20 ſhillings the hundred ready money, and in Barter hee will ſell it for 24 ſhillings: the other hath Sugar at 7 pence the pound ready money, The queſtion is at what rate it muſt be delivered in Barter to ſaue himſelfe harmleſſe, and how many pound he muſt deliuer for the tallow?

Iuni. To worke this queſtion, I firſt ſeeke at what rate the Sugar muſt be delinered in barter.

Example.

£. Re.	Bar.	Re.	7			
20	24 £.	7 d.	42	12		
12	7		84	7	d	2
240	168		168	84	84 | 8	4/12
			140		£ 0	5
			120			
			60			
			10			

Now doe I ſay, at 24 £. the C. what 18

72

36

432 £.

Then if 8 pence 2/7 be 1 pound of Sugar, how many pounds will 432 £. be?

Example.

li.	li	ſ.
8 2/7	1	432
5		12
42		864
		432
		5184
		5
		25920

3 2
x 7 8 1
2 5 9 2 0 | 6 1 7 5/7
4 2 2 2 7
4 4

I anſwere, if a hundred of Tallow that is worth 20 ſ. ready money, and is delivered in barter for 24 ſhillings, if hee will receive Sugar that is worth 7 d. the pound ready money, it muſt be delivered for 8 pence 1/7 of a peny the pound in barter, and for 18 hundred of Tallow at 24 ſhillings the hundred, he muſt haue 617 5/7 of Sugar at 8 pence 1/7 the hundred pound.

Theod. The next queſtion I will propound vnto you is this. Two barter, the one hath 725 pounds of Pepper at 2 ſhillings 4 d. the pound ready money in barter, he will haue 3 ſhillings the pound, the other hath Hollands at 5 ſhillings 4 d. the elle ready money, at what price ought he to deliuer his Hollands in barter to ſaue himſelfe harmeleſſe? and how many elles of Holland ought he to deliuer for the 725 pounds of Pepper?

Iuni. To worke this queſtion, I beginne as followeth.

Example.

Example.

If $\frac{7}{20}$ Rea. Wo. $\frac{3}{20}$ Bar. $\frac{4}{15}$ Rea.

36 — 20 — 4

20 — 140 — 12 — 36

720 — 6 15 — 60 — 72|0

19 s. 18 — 700 — 720 — 210|0

7 20 | 6 $\frac{20}{105}$ — 140 — 105

105 — 21 — 2100

7

If 1 pound of Pepper be woꝛth 3 ſhillings, what 725 pound?

3

2175 s.

48

If 6 $\frac{5}{7}$ be 1 Elle of Hol. 2175 s. be

7

15225

3

348

849 — Elles 3

15225 | 317 — $\frac{9}{47}$

4888 — 16

94

I anſwere, if 1 pound of Pepper that is woꝛth two ſhillings 4 d. ready money, and is deliuered foꝛ 3 ſhillings in Barter, 1 Elle of Holland that is woꝛth 5 s. 4 d. ready money, ſhall bee deliuered foꝛ 6 s $\frac{5}{7}$ in Bar-

ter, and for 725 pounds of Pepper there muſt be delivered 317 elles $\frac{3}{4}$ of an elle of Holland.

Theod. It is well anſwered, this ſhall ſuffice for the ſecond manner of Bartering: We will now proceed to the third manner, the firſt queſtion I will propound unto you, is thus. Two Marchants Barter, A hath 20 Tunnes of Aſhes at 54 pounds the tun, which in Barter he ſelleth for 55 pounds $\frac{1}{3}$, B hath Allum at 12 pounds $\frac{1}{4}$ the hundred, and he will have 360 pounds ready money of A, how muſt he rate the hundred of Allom in barter? and how much Allom muſt he deliver for the ſame 20 Tuns of Aſhes and 360 pounds ready money?

Iuni. To worke this queſtion, I beginne as followeth.

If 1 tun be 54 li. what 20 *facit.* 1080 li.

If 1 tun be 55 li. $\frac{1}{3}$, what 20 *facit.* 1110 li.

1080 in Mo.	1110 in Bar.
360	360
1440	1470

If 1440 li. be 1470 li, what 12 li. $\frac{1}{4}$ *facit*, 12 li. $\frac{6}{15}$

4	49	2		
5760	13230	39		
	5880	40		
	72039	2541	li.	97
		72039 | 0	12	$\frac{3}{5}$
		57606 | 0		192
		57		

If

If 12 li. $\frac{67}{192}$ be one hundred of Allom, what will 1470 pounds be?

12	li	192
384	2432	2940
1927	48823	13230
9	282240 | 117 $\frac{1323}{2401}$	1470
2401	24000	282240
	2400	
	24	

I anſwere, the Allom muſt be deliuered at 12 li. $\frac{27}{192}$ of a pound in barter, and there muſt be deliuered 117 Kintals $\frac{77}{490}$ of a Kintall, at that rate to ballance the barter of 20 Tuns of Aſhes at 55 pounds $\frac{1}{2}$ the Tunne in barter, and 360 pounds ready money.

Theod. The next queſtion that followeth, is thus. Two Marchants barter, A hath Linnen Cloth at 10 pence the elle ready money, in barter he will haue 15 s. the elle. B hath 3200 pounds of Sugar at 7 pence the pound ready money, but hee will haue of A 20 pounds in ready money, the queſtion is at what rate the Sugar muſt be deliuered? and how much Linnen Cloth A ſhall giue vnto B?

Iuni. To worke this queſtion, I beginne as followeth.

Example.

Example.

If 10 ß. be 15 pence, what 7 ß. *facit*, 10 ß. $\frac{1}{2}$, at 10 ß. $\frac{1}{2}$ what

3200
1600
1096 8
144 4
2800 0
140 0 0
20 0 0
120 0 0

If $\frac{1}{16}$ be 1 elle, what 120
16
720
120
1920 elle.

I anſwere, the Sugar is to be deliuered at 10 ß. $\frac{1}{2}$ ß. the pound, and there is to be payd vnto B 20 li. ready money, and 1920 elles of Cloth at 15 ß. the elle, and ſo is the barter ballanced and this may ſuffice for the third kind of barter.

Theod. You ſay well, we will now proceed to the fourth kind of Barter, the firſt queſtion is this. Two Marchants barter, A hath Pitch at 40 pounds the laſt ready money, and hee ſelleth it at 42 pounds in barter. B hath Damaſke at 4 ſ. 8 ß. the yard ready money, how muſt hee rate it in barter that hee may gaine 6 li. in

in the hundred more then A.

Iuni. To worke this queſtion, I begin thus.

Example.

If 40 be 42, what 100 pounds?

100

li. 4200

420	0	105
444	0	6
		111

If 100 be 111, what 56 be?

111				4
56			ß.	8
666	62	16	62	56/100
555	XX	00		50
6216				25

I anſwere, B muſt deliuer his Damaske at 5 ſhillings 2 ß. 56/100 parts of a peny the yard to ſaue himſelfe harmeleſſe, in giuing vnto A 42 pound in barter for Pitch that coſt but 40 pound ready money.

Theod. You haue well done, I will onely propound this laſt queſtion vnto you by 3 or foure ſeuerall varieties, and ſo will leaue to worke any more queſtions in barter, but neuertheleſſe I will afterwards expreſſe a few ſeuerall queſtions with their ſolutions, and leaue them to be wrought by you at ſome time of leaſure, it now followeth. Two Marchants barter, A hath Pitch at 40 pound the Laſt ready money, and in barter hée rated it at 42 pounds, B hath Damaske

maſke at 56 pence the yard, and he rated it at 62 d. $\frac{4}{17}$ parts of a penny in barter, how much gaineth the one more then the other.

Iunii. To worke this queſtion, I beginne as followeth.

If 56 be 62 $\frac{4}{17}$, what 100?

25	25		
280	310	XX	li.
112	1244	XXXX | 00 |	111 B
1400	155400	XXXX | 00 |	
		XX	

If 40 pound be 42 pound, what 100?

100	
4200	42'0 | 0 | 105
	XXX | 0

I anſwere, that B getteth 6 pounds in 100 pounds more then A.

Theod. You haue truely anſwered, the next manner of propounding the ſame queſtion is thus: Two Marchants Barter, A hath Pitch at 40 pounds the laſt ready money, and at 42 pounds the laſt in barter. B hath Damaſke in barter at 62 pence $\frac{4}{17}$, and he findeth 6 in the hundred gained more then A hath gotten, what did a yard of Damaſke coſt at firſt?

Iunii. To worke this queſtion, I beginne as followeth.

If

If 40 pounds be 42 pounds, what 100 pounds?

100	li.
4200	42 0 | 105
	4 4 0 | $\frac{5}{11}$ li.

If 111 li. be 100 pound, what 62 $\frac{4}{11}$?

25	25	
555	310	4 4
222	1244	6 6 3
2775	155400	2 9 5 v.
		15 5 4 0 0 | 56
		2 7 7 5 5
		2 7 7

I anſwere, 1 yard of Damaſke will coſt 56 pence in ready money.

Theod. It is well anſwered: the third manner of propounding this queſtion is thus. Two Marchants barter, A hath Pitch in barter at 42 pounds the Laſt, B hath Damaſke at 56 pence the elle ready money, and at 62 li. $\frac{4}{11}$ in barter, and hee findeth that there is gained 6 in the hundred by the ware more then A getteth in his, what did a laſt of Pitch coſt ready money?

Iuni. For the ſolution of this queſtion I beginne thus.

If

If 56 ℔. be 62 $\frac{4}{11}$, what 100 pound?

25	25				
280	310	XX		li.	
112	1244	XXXX	00	111	℔
1400	155400	XXXX	00	$\frac{4}{11}$	
		XX			

If 105 pounds be 100 pound, what 42 pound?

		li.		
		100		
4200	40	Rea. Po.		
XOXX				
XO				

Theod. The fourth manner of propounding this queſtion is thus. Two Marchants barter, A hath pitch at 40 li. the Laſt ready money, B hath Damaſke at 56 ℔. the yard ready money, in barter hee will haue 62 ℔. $\frac{4}{11}$, how deare muſt A rate a Laſt of Pitch in barter that he may gaine 6 li. the hundred leſſe then B?

Inni. For the ſolution of this queſtion, I ſay thus.

If 56 ℔. be 62 $\frac{4}{11}$, what 100?

25	25				
280	310	XX		li.	
112	1244	XXXX	00	111	℔
1400	155400	XXXX	00	$\frac{4}{11}$	li.
		XX			

If

If 100 pounds be 105 pounds, what 40 li.

40

4200 li.

42 | 00 | 42

00 |

I anſwere, the Laſt of Pitch at that rate to gaine 6 li. in 100 li. leſſe then B, muſt be rated at 42 li. in Barter.

Theod. I ſée you are ſufficiently perfected in theſe queſtions of Barter, therefore I will now expreſſe a few ſeuerall queſtions with their ſolutions, and ſo proceed further to the nert Rule, and the firſt queſtion expreſſed, is thus. A and B barter, B hath Sugar at 6. the pound ready money, A hath 12 péces of Linnen Cloth at 21 pound the péce ready money, in barter he will haue 23 pound the péce, and will haue of B the $\frac{2}{3}$ part ready money: more hee hath two Clothes of 40 yards the péce at 3 pound $\frac{1}{2}$ the yard ready money, and in barter he will haue 4 pounds the yard, and yet will haue $\frac{1}{2}$ part thereof to be paid him in ready money, the queſtion is at what rate B ſhall deliuer his Sugar in barter, that he may ſaue himſelfe harmeleſſe? alſo how many pounds of Sugar he muſt deliuer, and how much money he muſt gaine?

ſay.

If 1 péce be 21 pound, what 12 péces *facit*?

252 pounds Money.

If 1 péce be 23 pounds, what 12 péces *facit*?

276 barter.

Then ſubſtract the $\frac{2}{3}$ of the ouer price both out of price

price in ready money, and out of the price in barter, the Summes remaining are 206 pound in ready money, and 230 pounds in barter, then ſay.

If 1 yard be 3 pound $\frac{1}{3}$, what 80 yards? *facit.* 280 pounds money.

1 yard be 4 pound, what 80 yards? *facit.* 320 barter.

Then ſubſtract the $\frac{1}{4}$ of 320 pound which is 80, both out of the price ready money, there remaineth 200 li. then out of the price in barter there remaineth 240 li, then adde both the remainers in ready money together, *facit.* 406 pounds, then adde both the remainers in barter together, *facit.* 470 pounds, then ſay.

If 406 pounds ready money be 470 pounds in barter, what will 7 d. in ready money be? *facit.* 8 $\frac{3}{139}$.

Then ſay, if 8 pence $\frac{3}{139}$ parts of a peny be 1 pound of Sugar, what will 470 be? *facit.* 13920 li. Su.

Then adde 46 pounds and 80 pound together, *facit.* 126 pounds Money.

The ſecond queſtion, A and B barter, A hath 12 peeces of Linnen Cloth at 21 pound, the peece ready money, and will haue of B $\frac{1}{6}$ part in ready money: more he hath 2 Clothes of 40 yards the peece, at 2 li. $\frac{1}{2}$ ready money the yard, in barter hee will haue 4 li. the yard, and will haue $\frac{1}{4}$ ready money: B hath 13920 pounds of Sugar, at 7 pence the pound ready money, and hee will deliuer it at 8 d. $\frac{3}{139}$ parts of a peny in barter: The queſtion is what A muſt haue for his Linnen Cloth in barter?

If 1 yard be 3 $\frac{1}{3}$, what 80 *facit.* 280 pound Mo.

If 1 yard be 4 pound, what 80 *facit.* 320 pound Barter.

If

If 1 pound of Sugar be 7 ß. what 13920 pounds? *facit.* 406 money.

If 1 pound of Sugar be $8\frac{1}{12}$, what 13920 *facit.* 470 Barter.

Now you muſt firſt ſubſtract the $\frac{1}{4}$ of the ouerprice of of Clothes, which is 80 pound, out of 280 pound the price of money, there reſteth 200 pound, then you muſt ſubſtract 80 pound out of 320 pound, the price in Barter, there remaineth 240 pound, then ſubſtract 200 li. the price of the Cloth in money, out of 406 li the price of the Sugar in money, there reſteth 206 li. then ſubſtract the price of the Cloth in Barter which is 240 li. out of the price of the Sugar in Barter which is 470 pound, there remaineth 230 pound. Now ſeing that A will haue $\frac{1}{6}$ part of his Linnen cloth in ready money, there muſt be $\frac{5}{6}$ parts of the ſame bartered: then ſay,

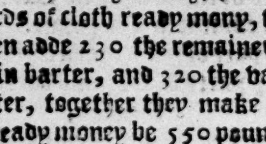
If $\frac{5}{6}$ parts be 230 pound, what will $\frac{6}{6}$ parts be? *facit.* 276 pound, then ſay,

If 12 peeces of Linnen cloth be 276 pounds, what ſhall 1 peece be, *facit.* 23 pound in barter.

The Third queſtion is deriued from the firſt, as the ſecond is, and it is thus. A and B barter, A hath 12 peeces of Linnen Cloath at 21 pound the peece ready money, in barter hee will haue 23 pound, and will haue $\frac{1}{6}$ part ready money: he hath meze 2 clothes of 40 yards the peece at 5 pound $\frac{1}{4}$ the yard ready money, in barter hee will haue 4 pound the peece. B hath Sugar at 7 ß. the pound ready money, in barter hee will haue 8 ß. $\frac{9}{12}$ parts of a penny, the queſtion is if A muſt haue money of B with the 2 clothes, and how much it muſt be? ſay,

If 1 péce coſt 21 li. what 12? *facit.* 252 li. Mo.
If 1 péce be 23 li. what 12? *facit.* 276 Barter.
If 1 yard be 3 pound $\frac{1}{2}$, what 80 yards? *facit.*
280 pound Money.
If 1 yard be 4 pound, what 80 yards? *facit.*
320 pound barter.

Now, out of 252 li. the valued price of 12 péces of Linnen cloth ready mony, ſubſtract 46 li. the $\frac{1}{6}$ part of the ouer price in barter, there remaineth 206 li. then ſubſtract 46 li. the $\frac{1}{6}$ part of the ouer price, out of 276 li. the valued price, in barter there remaineth 230 li. then adde 206 li. the remainer of the valued price of 12 péces of Linnen cloth ready money, & 280 li. the valued price of 80 yards of cloth ready mony, together they make 486 li. then adde 230 the remainer of 12 péces of Linnen cloth in barter, and 320 the valued price of 80 yards in barter, together they make 550 li. then ſay, if 486 li. ready money be 550 pounds in barter, what money ſhall be giuen when 7 ſ. in money is 8 ſ. $\frac{1}{3}$ of a penny in barter, & multiply croſſe wiſe, and ſubſtract the productions, there remaineth *facit.* 88 $\frac{2}{3}$.



Now ſubſtract 7 ſ. the valued price of 1 li. of Sugar ready money, out of 8 ſ. $\frac{1}{3}$ the valued price in barter, there remaineth 1 $\frac{1}{3}$, and diuide the ſame by 88 $\frac{2}{3}$, and you ſhall finde that there muſt be 80 pound payd ready money, which is the $\frac{1}{4}$ of 320 li. in barter, wherein no man is wronged.

The 4 queſtion is thus. A and B barter, A hath Flare at 24 pounds the 100 money, in barter hée will haue

haue 31 pound $\frac{1}{6}$ part of a pound, winning 12 pounds the hundred more then B, and B hath Wainſcot at 12 pound the hundred ready money in barter, he will haue 15 pound, the queſtion is what and how much he ſhall pay one to the other in ready money? ſay.

If 112 pound be 100, what 31 pound? $\frac{1}{6}$ *facit.*
27 pound $\frac{9}{17}$.

So ſhould A rate his Flare in barter, if hee deſired not to gaine 12 pound the hundred more then B, now as A rated his ware in barter, the queſtion is which of them both made the beſt bargaine? diuide each mans ſumme in barter by his ready money, and hee that hath the greateſt production muſt giue mony vnto the other, the production of B is 1 $\frac{3}{17}$, the production of A is 1 $\frac{1}{4}$, and 1 $\frac{1}{4}$ is more then 1 $\frac{3}{17}$, therefore B giueth ready money vnto A, and if you will know how much, multiply croſſe wiſe, and ſubſtract the productions, as in the laſt example, there reſteth 27 $\frac{8}{17}$, which diuide by 3 the difference, and there will be 9 $\frac{5}{17}$, which are 27 li. $\frac{8}{17}$ in barter, the third whereof B paid vnto A ready money.

The Fifth Queſtion is thus. Two Marchants barter, A hath Wheate at 24 pounds the Tunne ready money, in barter at 27 pounds to be deliuered at 3 Moneths: B hath Cheeſe at 5 pounds the hundred to be deliuered at 6 moneths; the queſtion is at what rate he ſhall deliuer his Cheeſe in barter? ſay by the Rule of 3 compoſed, if 24 pound in 3 moneths gaine 3 pound, what ſhall 5 pound gaine in 6 moneths? *facit.* 1 pound $\frac{1}{4}$, which 1 pound $\frac{1}{4}$ adde vnto 5 pound and it maketh 6 pound $\frac{1}{4}$, and ſo much muſt his cheeſe be ſold for in barter.

The ſixt and laſt queſtion according to this Rule, is thus. A and B barter, A hath peeces of Linnen Cloth at 12 pound the peece ready money, in barter he will haue 16 pound the peece at 4 moneths time to be deliuered, and will haue $\frac{1}{3}$ in money: he hath more 4 peeces of Karſey at 32 li. the peece ready money, in barter hee will haue 36 pound at 6 moneths time to be deliuered, and will haue $\frac{1}{6}$ part in ready money. B hath ſpice at 16 pound the hundred ready money, the queſtion is at what rate he ſhall deliuer it in barter at 8 moneths time of deliuery, alſo what ſpice and ready mony hee muſt deliuer vnto A, ſay,

If 1 peece be 12 li. what 6 peeces *facit.* 72 li.

Then if 1 peece be 16 li. what 6 peeces *facit.* 96 pound.

Heere you ſee that 12 peeces ready money are 72 pound, and in barter 96 pound, out of both you muſt ſubſtract $\frac{1}{3}$ of the ouer price, which is out of 96 li. you muſt ſubſtract the 4 part thereof which is 24 pounds, for ſo much muſt be paid in ready money; taking 24 out of 72 li. there reſteth 48, taking 24 out of 96 there reſteth 72 pound, ſo that 48 li. in ready money is 72 li. in barter at 4 moneths time to be deliuered.

Now ſay, if 1 Karſey be 32 pound, what 4 Karſeis, *facit.* 128 pounds.

If 1 be 36 pounds, what 4 *facit.* 144 pounds.

Then you muſt ſubſtract the $\frac{1}{6}$ part of the ouer price that is to be paid in ready money, out of both of them which is 24 pound, take 24 li. out of 128 pounds there reſteth 104 pound, take 24 out of 144 pounds there reſteth 120 pounds, ſo that 104 pounds in ready money is 120 pound in barter, at 6 moneths time to bee deliue-

red

red. Now ſeeke by the Rules of paiment when this were to be deliuered, if it ſhould bee deliuered all at one time, that is to ſay, multiply 72 pound the rate of the firſt Cloth in barter by 4 moneths the time when it it is to be deliuered, the number produced is 288, then multiply 120 pounds the rate of the ſecond parcell of Cloth, that is to be deliuered by 6 moneths, the time when it is to be deliuered, the number produced will be 720, which 2 numbers adde together for diuidend, then adde 72 li. and 120 li. together for diuiſor, and diuide them the one by the other, you ſhall finde 5 moneths $\frac{1}{4}$ parts of a moneth, then adde both their rates in ready money together that remaineth when the ouer prices are ſubſtracted, that is 104 pound and 48 pound which maketh 152 pounds, then adde the rates in barter together, that which remaineth when the ouer prices are ſubſtracted, that is 72 pound and 120 pounds, which is 192 pounds, out of which rates in barter ſubſtract the rates in ready money, that is, out of 192 li. ſubſtract 152 pounds, and there remaineth 40 pounds gaine, then ſay by the Rule of 3 compoſed, if 152 li. in 5 moneths $\frac{1}{4}$ gaine 40 pounds, what ſhall 16 pounds gaine in 8 moneths, *facit.* 6 li. $\frac{156}{19}$, which adde vnto 16 li. it maketh 22 li. $\frac{156}{19}$, and for ſo much ſhall B rate his Spice in barter, then adde 24 li. money for the Linnen Cloth, and 24 li. money for the Karſeyes, it maketh 48 li. that B muſt pay to A in money: now to know how much Spice muſt bee deliuered from B to A, ſay by the Rule of 3, if 22 pounds $\frac{156}{19}$ bee 100 li. of Spice, what will 192 pounds be? *facit.* 856 pounds $\frac{296}{418}$ parts of a pound of Spice, that B muſt deliuer to A with the 48 pounds of money.

Theod. This ſhall ſuffice for your inſtruction in this Rule, and I doubt not but at your leaſure you wil make vſe of thoſe queſtions which I haue here expreſſed, with their ſolutions: I will now proceed vnto the next Rule which is Allegation.

Iuni. I pray you doe as you intend, for I greatly deſire to haue the full and perfect vſe of this Art, but I pray you ſir, are there many more Rules yet to learne?

Theod. When you haue the vſe of the next Rule that followeth, you haue as much as may bee ſhewed you in Arithmeticke, to reſolue any queſtion that may be propounded vnto you, that ſhal tend to the vſe of any Marchant or tradeſman, then there are yet other queſtions taught in Arithmeticke, which for their pleaſant working you cannot but deſire their vſes, when you ſee what matter may be comprehended by them, yet are they more to bee vſed for pleaſure then for any profite that is to be attained by them; but if your time will ſerue, my deſire is you ſhould haue the knowledge of them all.

Iuni. I am much bound vnto you for your loue, and great deſire you haue of my furtherance in knowledge, and by Gods helpe I will not depart from you vntill I haue attained as much as your deſire is I ſhould in this excellent Art, and therefore I pray you proceed as you intend.

The Rule of Allegation.

THeod. The firſt queſtion I will pro-pound vnto you, is thus. A Marchant hath 4 ſorts of Rye at 28 pounds, 29 li. 32 pounds, and 36 pounds the Tunne; of theſe 4 ſorts he will ſell 20 Tunns at 30 pound the Tunne one with the other, the queſtion is how much of each ſort he muſt deliuer? but before you worke this queſtion I will giue you ſome inſtruction that is thus, you muſt ſet downe your ſeuerall prices and note the differences, then the whole quantity of differences being added together, that number ſo produced is the firſt number in the Rule of 3 in euery worke, the quantity of Tunnes that you are to haue is the ſecond number in the Rule of 3 in euery worke, and the firſt difference is the third number in the Rule of 3 in the firſt worke, and ſo muſt you make a ſeuerall worke for euery ſeuerall difference, euen like as you did in the Rule of Fellowſhip for euery partner, the quotient ſheweth you how many Tuns you muſt haue of each ſort, but this you muſt alſo note, you muſt compare the valued prices with the common price to finde the difference, and be ſure to ſet euery difference againſt the price with which it is compared.

Iuni. I vnderſtand you very well, I pray you giue me leaue and I doubt not but by the worke of this Example I ſhall be able to worke any ſuch like, therefore I beginne thus.

Example.

30 { 28 | 2
29 | 1
32 | 2
26 | 6

11 20 2 — 40

£7 Tunnes. li.
4 0 | 3 $\frac{7}{11}$ of 28
£ £

£9 Tunnes. li.
2 0 | 3 $\frac{9}{11}$ of 29
£ £

11 20 2 — 40

£7 Tunnes. li.
4 0 | 3 $\frac{7}{11}$ of 32
£ £

11 20 6
6
120

X
XXX
XXX
X

120 | 10 $\frac{10}{11}$ of 36 li.

Iuni. Heere haue I wrought according to your direction, and I find that there muſt be taken of 28 pound the Tun, 3 Tun $\frac{7}{11}$ of 29 li. 1 $\frac{9}{11}$ of 32 li. 3 $\frac{7}{11}$ of 36 li. 10 $\frac{10}{11}$, for proofe I ſée as in the Rule of Fellowſhip, I adde euery mans gaine together, ſo there I adde the quantities of euery ſeuerall price together, and they make the iuſt quantity of 20 Tunnes, therfore haue I wrought truely.

Theod. You haue well done, the next queſtion I will propound vnto you, is thus. A Marchant hath 2 ſorts of wine, of 4 d. the quart and of 6 d. the quart: of theſe 2 ſorts he will fill a veſſell of 128 quarts, which ſhall coſt him no more then 47 s. 2 d. the queſtion is, how many quarts he muſt take of each ſort.

Iuni. To worke this queſtion, I ſéeke firſt by the Rule of 3 direct what one quart is worth, ſaying if 128 Quarts coſt 47 ſhillings 2 pence, what ſhall one quart coſt?

Example.

Example.

128 47 ℔. 2 ℥.
12
94
472
566

x 5
x 84 ℥.
566 | 4 $1\frac{54}{128}$.
x 128

101
4 ℥. $\frac{37}{64}$ { 6 | $1\frac{37}{64}$ 2 ℥. 128 $1\frac{37}{64}$
4 | $\frac{37}{64}$ $\frac{64}{128}$ 101 $\frac{37}{101}$

x Quarts 2 ℥. 128
x 128 | 101 of 6 ℥. 1280
x 88 12928
x x
x

2 ℥. 128 $\frac{37}{64}$
27 2
896 128
256
3456

x
x 80
89 Quarts.
3456 | 27 of 4 ℥.
x 88
x x

3

I anſwere, there muſt be 101 quarts of 6 pence the quart, and 27 quarts of 4 d. the quart: which being added together maketh the iuſt ſum of 128 quarts.

Theod. It is well anſwered, the next queſtion I will propound vnto you is thus: If a quart of wine coſt 5 pence, how much water muſt bee mingled with 128 quarts of Wine, that it may ſtand but in 4 pence $\frac{1}{2}$ of a peny.

Iuni. To reſolue this queſtion, I ſay by the Rule of 3, if $4\frac{1}{2}$ be $\frac{1}{5}$ leſſe, what 128 quarts?

Example.

		2		Quarts.
$4\frac{1}{2}$	$\frac{1}{5}$	128	$14\frac{2}{9}$	water.
		9		

Theod. Againe, A Marchant hath 128 quarts of Wine, wherewith hee mingled $14\frac{2}{9}$ quarts of water, and hee findeth being ſo mingled the quart is worth 4 d. $\frac{1}{2}$ d. the queſtion is, what a quart of Wine coſt at the firſt.

Iuni. To worke this queſtion I ſay, if 1 quart be 4 d. $\frac{1}{2}$ d. what 142 quarts $\frac{2}{9}$ *facit.* 640 pence? and ſo much the whole 128 quarts mingled amount vnto which is 5 d. the quart.

Theod. You haue anſwered truely, the next queſtion I demand of you is this. A Marchant hath a pèrce of Wine of 128 gallons, out of the which hée draweth 16 gallons, and filleth it vp againe with water; againe, hée draweth out 16 gallons, and filleth it againe

againe with water the third time he doth the like, and filleth it againe with water, as alſo the fourth time, and filleth it againe with water, the queſtion is how much Wine and Water remaineth in the peece of Wine?

Iuni. I am now to ſeeke, I pray you let mee crave your helpe, or elſe the queſtion muſt be vnanſwered.

Theod. To worke this queſtion you muſt doe thus: Firſt diuide 128 by 16 and you ſhall finde it contained 8 times, out of the which ſubſtract 1 there remaineth 7, then is the proportion as 8 to 7; then multiply thoſe 2 numbers quadrably, & ſay by the Rule of 3, if 4096 be 2401, what ſhall 128 be? *facit.* $75\frac{1}{17}$.

Iuni. I pray you, what meane you in that you ſay I ſhall multiply quadrably?

Theod. It is thus, euery Diget multiplyed in it ſelfe is ſquared, as 8 multiplyed into 8 is 64, which is the ſquare of 8, then 64 ſo produced being multiplyed by 8 againe, is the Cubicke number of 8 whoſe product is 512, then 512 by 8 is 4096, & ſo euery number multiplyed in it ſelfe, and that product multiplyed by the ſame number, againe is multiplyed cubically, ſo againe, by the firſt is quadrably or a ſquare of ſquares: wherefore to giue you ſome light into the working of ſuch like queſtions as theſe are, I here propound vnto you one queſtion, and explaine the manner of working it, with the ſolution thereof, and ſo proceed to the nert Rule.

Iuni. I pray you propound it, and giue mee leaue to worke it, if I be in doubt I will crave your helpe.

Theod.

Theod. I am content to ſatisfie your deſire, the queſtion I will propound vnto you, is thus. A Goldſmith hath 8 Markes of fine Siluer, out of the which hée cutteth a Marke, and in place thereof putteth a Marke of Copper, then hauing mingled it, hée cutteth off againe 1 Marke of Siluer, & putteth therein againe 1 Marke of Copper, the like doth he alſo the third time, the queſtion is, how much a Marke as it is mingled, doth hold?

Iuni. To worke this queſtion, I firſt ſubſtract one Marke from 8 Markes, there reſteth 7 Markes, the which 7 I multiply in it ſelfe cubicke wiſe, and likewiſe 8 in it ſelfe cubicke wiſe, the numbers produced are 343 and 512.

Example.

7	8
7	8
49	64
7	8
343	512

Now doe I ſay by the Rule of 3, If 512 be 343, what ſhall 12 be?

Example.

Example.

1 Parke of fine Siluer is 12 d. waight.

12 343 12

12

686

343

4116

2

30 5

4116 | 8 $\frac{30}{115}$ peny waight.

4112 | 128

Here doe I finde, when 1 Parke of fine Siluer is cut out at 3 ſeuerall mixtures and 3 ſeuerall times, & euery time a Parke of Copper put in for it, that one Parke of the laſt mixture doth hold 8 peny waight and $\frac{30}{115}$ of a peny waight fine.

Theod. You haue well done, and truely anſwered the queſtion: but becauſe I would haue it eaſie to your vnderſtanding, I will make it more plaine vnto you, therefore conſider thus: If 1 Parke of fine Siluer be 12 penie waight fine, how many penny waight fine is 8 Parkes? Multiply 12 by 8 and you ſhall find 96, out of that ſubſtract 1 Parke of fine Siluer, and there reſteth yet 84 penny waight fine: then againe, to put in 1 Parke of Copper, therefore the 8 Parkes be 84 penny

penny waight fine, then diuide 84 the fineneſſe by 8 the number of markes, and you ſhall finde that it is 10 penny waight $\frac{1}{2}$ fine, which take out of 84 penny waight fine there reſteth 73 $\frac{1}{2}$, which diuide againe by 8 marks and it maketh 9 $\frac{3}{16}$ penny waight fine for one Marke, after that the ſecond marke of Copper is put to it, then take 9 $\frac{3}{16}$ penny waight fine out of 73 $\frac{1}{2}$ penny waight fine, there reſteth 64 $\frac{5}{16}$ penny waight fine, which diuide by 8 markes, and it maketh 8 $\frac{5}{128}$ of a penny fine, for the Marke after it hath béen mingled with Copper the third time, and this ſhall ſuffice for this Rule: We will now proceed vnto the next Rule, which is the rule of Falſhood, or of falſe poſitions.

Iuni. I giue you great thankes for your paines, and ſince you tolde mee of the other Rules that follow, I greatly deſire to haue ſome knowledge in them, that I may as well yéeld pleaſure vnto my friend by the excellency of this Art, as profite to my ſelfe, and ſuch other for whome I ſhall make vſe thereof.

Theod. I will ſatisfie your deſire God willing, for as you deſire to haue that knowledge that is as well pleaſant as profitable, ſo it is my deſire that you ſhould be expert in all queſtions and ready to reſolue any queſtion that ſhall be demanded, and may be wrought by naturall Arithmeticke.

Iuni. I pray you proceed as you intend.

The Rule of False Positions.

Theod. FOR the more easie vnderstanding of this Rule, I will giue you this instructiō, it is called ỳ Rule of false Positions, not because it is false of it selfe, but because that by two false numbers which are propounded, the true Summe is found out, the manner of working being thus, take a number at your pleasure and proceed in working therwith as if it were the right number, and if by the same working there commeth out more then should be, then marke it with this signe × which signifieth more, and if it bee lesse then there should bee, marke it with this signe —— which signifieth lesse, and if you find 2 × × or 2 —— —— then subtract the one from the other, but if it be 1 × and 1 —— then you must adde them together, and the production shall be you diuisor: Then multiply the opposed numbers with the full productions crosse wise, and if they be both × or both —— then subtract the one out of the other, but if they bee × and —— then adde them together and diuide the production by the diuisor, and the quotient shall be the true number you desire: the first question I will

will propound vnto, is this.

A young man is in a garden, and findeth certaine young Maides, to whome he ſaith God ſaue you all 12 faire maids, whereunto one anſwered wee are not 12, but if we were 4 times ſo many more as we are, then we ſhould be as many more then 12, as we are now leſſe then 12, the queſtion is how many Maids they were?

I take the ſuppoſition to be 16, therefore firſt I ſuppoſe there were 8, now if there muſt be 4 times as many more, that is 4 times 8 more, then that ſuppoſition muſt be 40, from the which I ſubſtract 16 there remaineth 24 ✕ then I ſuppoſe there were 10, now if there ſhould be 4 times more, then the ſuppoſition is 50, frō the which I ſubſtract 16, there remaineth 34, then becauſe they are both to much I ſubſtract the 2 ſuppoſitions one from the other, ther remaineth 10, which I kæpe for my diuiſor, then I ſubſtract the 2 numbers, firſt ſuppoſed 8 and 10 out of 2 ſuppoſitions, and there remaineth 40 for diuidend, then I demaund the diuidend by the diuiſor, and the quotient giueth me Foure Maides that were in the Garden.

Example.

16	8 ✕ 24	
24	10 ✕ 34	Maids.
40		10. 40 | 4
		40

Theod. Sir, This Rule ſæmed very ſtrange vnto me, but now if it pleaſe you to propound vnto mee a few ſeuerall queſtions, I doubt not but I ſhall bee able to comprehend them my ſelfe.

Theod. I will ſatisfy your deſire: A Marchant is indebted 800 li. to pay at 4 moneths end, when one moneth is paſt he payeth 200 pound, and 1 moneth ½ after the firſt moneth hee payeth 300 pound, at what time ſhall hée pay the reſt.

Inni. I ſay hee vſeth the 800 pound 1 moneth, then hée payeth 200, and 1 moneth ½, after hee payeth 300 pound which I muſt deduct out of the 600 li. that was reſting when hee payd the laſt 200 pound, then hée is yet to pay 300 pound moze, now I take the queſtion thus, that you deſire to know how long that 300 pound ſhall be forbozne after the payment of the laſt 300 li. to recompence the ſummes of Money aforehand paid.

Theod. Your Judgement is to my expectation, therefore proceed; I hope you will proue expert in this Rule ſhortly.

Inni. I then beginne to proſecute my worke thus: I firſt conſider 800 pound is forborne 1 Moneth, and at the moneths end 200 pound béing payd, I ſubſtract the ſaid 200 pound, and there reſteth yet 600 pounds forborne, then 1 moneth ½ after the 200 pound is paid, there is then 300 pounds more paid, which I ſubſtract out of 600 pound, now there reſteth yet 300 pound to pay: to know how long this money ſhall bée forborne, I firſt multiply 800 Pound by 1 moneths time, and 600 li. by 1 moneths ½ time, then I ſuppoſe the 300 li. yet vnpayd ſhould be forborne 2 moneths after the money is due, therefore I multiply the ſaid 300 pounds by 2 moneths time, and adde all their products together which make 2300, then I multiply 800 li. by 4 moneths time, and the number produced is 3200 li.

which

which is too little by 900, then I ſuppoſe the 300 li. is yet vnpaid & is to bee forborne 4 moneths, the number produced is 1200 which beeing added with the reſt of the payments maketh 2900, which I ſubſtract out of 3200 againe, and I find 300 too little, then I worke according vnto the Rule and find the 300 li. is to bee payd 5 moneths after the laſt payment of 300 li.

Example.

36	2	900	
6	4	300	6 Diuiſor.
30 | 5 Moneths.			
8			

Theod. You may proue this example by the Rule of payment, Multiply euery payment by his time, and you ſhall find it was payd iuſt at 4 moneths one with the other.

Iuni. I will ſone try it if you pleaſe.

Example.

1	800——800		Mo.
1½	600——900	32|00|4	
5	300——1500	8|00	
	3200		

Theod. It is well done, the next queſtion is thus. A man hath hyred a Labourer for 40 daies in ſuch ſort, that when hee worketh he ſhall haue 3 d. the day, and when he playeth hee ſhall be rebated 5 d. in a day,

now when the 40 daies were ended, they find that neither of them could aske any thing one of the other, the queſtion is, to know how many daies hee wrought, and how many hee played.

Iuni. For the ſolution of this queſtion, I beginne as followeth.

Example.

Daies.

20 —— 40

30 × 40

50

25 daies he wrought.

At 3 d. what 20

3

60

at 5 d. what 20

a daie. daies. 5

30 10 100

3 5 60

90 50

50 40

40

Sir, I am now to ſeeke, I pray you let mee craue your helpe.

Theod. Note that when the one poſition is equall vnto the other, and that the one bee × and the other ——, then you muſt onely adde the 2 ſuppoſitions together, and take the ½ of that number ſo produced is the iuſt number of daies that he wrought, that is adde 30 and 20 together it maketh 50, whereof the ½ is 25, ſo many daies he wrought, and 15 daies he played.

Iuni. Here it is found, how many daies hee wrought: I pray you giue mee leaue, and I will find by

by the ſame Rule the time that he played.

Theod. Proceed as you intend, I ſhall bee glad to ſée you vſe ſome varietie of worke in theſe queſtions hauing ſuch ſmall practiſe.

Ium. I proſecute my worke thus, as this example ſheweth.

	18	20	10
	5	3	5
	90	60	100
	66	22	60
20 × 40 | 16	24 × 1/66		40 ×
18 × 24 |		24	18
16		20	40
			720
18 daies.		400	480
240 | 15 played.			240
288			
1			

I anſwere as by this example appeareth, that hée played 15 daies, and wrought 25 daies.

Theod. The next queſtion is thus. A Marchant buyeth Cloth, and if hée take 12 Clothes then he wanteth 42 li. to pay, and if he take but 9 Clothes then he hath 84 pound too much money: the queſtion is, how much money hée had? how much a Cloth coſt, and how many Clothes hée bought?

Example.

36	36	432	324	12	40
12	9	42	84	40	9
72	324	390	408	480	360
36			390	42	84
432				438	444
			18 li.	X	438
					006

Cloth.		Denisor.		
36	18	12	36	18
40	6		6	40
			216	720
				216

82	li.		
504	42 a Cloth.	504	dividend.
xzz			
2			

I anſwere the Clothes hee bought coſt 42 li. the Cloth, to know how much money hee had, I multyply 42 by 12, the number ſo produced is 504 Pound, out of the which I ſubſtract 42 li. for ſo much money hee wanted, there reſteth 462 li. ſo much money hee had, then to know how many Clothes he bought, I divide 462 pound, by 42 Pound the price of 1 Cloth, the quotient giveth mee 11 Clothes, and ſo many were by.

Theod.

Theod. You haue anſwered well the queſtion, I will propound ſome other of theſe queſtions with their ſolutions, which you may worke at ſome time of your leaſure, and the next that followeth, is thus.

A Young Man hath gathered certaine Apples in a Garden, hauing them hée met with 3 Maides, which deſired to haue ſome of his Apples, whereof he giueth the firſt mayde $\frac{1}{2}$ part of all his Apples, and ſhe giueth him 3 Apples againe; to the ſecond Mayd hee giueth $\frac{1}{3}$ part of his Apples remaining, and ſhe giueth him 2 againe, to the third Mayd he giueth $\frac{1}{4}$ part of the reſt of his Apples left, & ſhe giueth him 1 againe, with which he hath 13 left, the queſtion is how many Apples hee had at the firſt. Say hée had 16 of the which $\frac{1}{4}$ part is 4 ſubſtracted out of 16 there remaineth 12: whereof there were 3 giuen againe, then had hée ſtill 15, out of the which take $\frac{1}{3}$ part, which is 5 for the ſecond mayd, and there reſteth 10, then 2 giuen him againe maketh 12, out of which take $\frac{1}{7}$ part which is $1\frac{5}{7}$ parts, there remaineth $10\frac{2}{7}$, then 1 giuen him againe maketh $11\frac{2}{7}$, now hée ſhould haue had 13 Apples left, therefore it is $1\frac{5}{7}$ parts too little: for the ſecond ſuppoſitiõ I take 24 the $\frac{1}{4}$ part is 6, there reſteth 18 and 3 giuen againe is 21, out of the which I take $\frac{1}{3}$ part which is 7, there reſteth 14 and 2 giuen againe is 16, out of the which I take $\frac{1}{7}$ which is $2\frac{2}{7}$, there reſteth $13\frac{5}{7}$ 1 giuen backe is $14\frac{5}{7}$, and it ſhould bee but 13, ſo is it $1\frac{5}{7}$ parts too much, then hauing 16 for your firſt ſuppoſition, and 24 for your ſecond ſuppoſition, adde the ſuppoſitions it is 40, whereof take the $\frac{1}{2}$ it is 20, and ſo many Apples hée had.

The next queſtion is thus. A Man maketh his will, and willeth that each Child ſhall haue alike of his goods. Now to the firſt Child was giuen 100 li. and $\frac{1}{6}$ part of that which did remaine, to the ſecond was giuen 200 pound and $\frac{1}{6}$ part of the money remayning, the third Child had 300 li. and the $\frac{1}{6}$ part of the money remaining, and ſo to euery Child 100 li. and $\frac{1}{6}$ part of the money remaining, and ſo the Fathers Will was perfoꝛmed: the queſtion is, how much money the Father left behind him: and alſo how many Childꝛen they were? and how much each of them had to their part? Take foꝛ the firſt ſuppoſition 2500, out of the which take 100, there reſteth 2400, the $\frac{1}{6}$ thereof is 300, there reſteth 2100: the firſt Child hauing 400 li. foꝛ his part, out of the which take 200 li. and $\frac{1}{6}$ of that which remaineth, and you ſhall find 437 pound $\frac{1}{2}$ foꝛ the ſecond Child, and 1662 pound $\frac{1}{2}$ remaining: now the firſt Child hath but 400 Pounds, and the ſecond Childs money muſt bee equall vnto the firſt, therefoꝛe he hath 37 pounds $\frac{1}{2}$ ✕ ſay then the money was 2300 pounds, from the which ſubſtract 100 pounds and the $\frac{1}{6}$ of that that is remaining which is 400 Pounds, ſo haue you 500 pound foꝛ the firſt Child, and there reſts 2800 pound; take from that 200 pounds and the $\frac{1}{6}$ part of that which remaineth, which adde together and you haue foꝛ the ſecond Childs part 525 Pounds, and it ſhould bee but 500 li. to equall the firſt Childs part, therefoꝛe it is 25 pound, ✕. Now proceed acoꝛding to the queſtion, and you ſhall find *facit*. 4900 pound the Summe of all the money hee had to diuide, out of the which ſubſtract 100 Pound, and the $\frac{1}{6}$ part of

that

that which remaineth, and you ſhall find 700 Pound for the firſt Childs part. Then ſay by the Rule of 3, If 700 pound be 1 Childs part, what ſhall 4900 pound be *facit.* 7 Childrens parts.

The next queſtion is thus. If 8 yardes of red Veluet and 6 yardes of græne Veluet coſt together 64 pound, and at the ſame price 11 yardes of red Veluet, and 9 yards of græne Veluet coſt 91 Pounds, the queſtion is what one yard of red Veluet, and one yard of græne Veluet coſt apart. Say the yard of red Veluet coſt 6 pound, which multiply by 8 yards is 48 li. that ſubſtracted from 64 pound, there reſteth 16 pound for 6 yards of græne Veluet, then 1 yard of græne Veluet muſt coſt 2 pound $\frac{2}{3}$ parts of a pound, then ſay if one yard of red Veluet coſt 6 pound, what ſhall 11 yards coſt? *facit.* 66 li.

Say againe, If one yard of græne Veluet coſt 2 pound $\frac{2}{3}$ parts, what ſhall 9 yards coſt? *facit.* 24 li. which added to 66 pound is 90 pound, which ſhould be 91 pound, it is therefore 1 pound —— ſay then that one yard of red Veluet coſt 7 pound, and worke as you are taught, it will be —— 2 pound, then proceed according to the manner of the Rule: and you ſhall find that 1 yard of red Veluet will coſt 5 pound, and 1 yard of græne Veluet will coſt 4 li. then ſay by the rule of 3.

If

If 1 yard of red Velvet coſt 5 pound, what will 8 yards coſt? *facit.* 40 pound.

If 1 yard of gréene Velvet coſt 4 pound, what ſhall 6 yards coſt, *facit.* 24 pound, adde both together, it maketh 64 pound your demand.

The next queſtion is thus. A ſaith to B giue mée 4 Pound, then haue I as much money as you: to whome B ſayd giue me 4 Pound, then haue I 9 times as much as you haue, the queſtion is how much each of them had in money? Say A hath 8 pound then hee had 16 pound, for if A had 4 pound from B then each man hath 12 pound; but if B receiue 4 pound of A, then B hath 20 pound, and A hath 4 Pound, but B muſt haue 9 times ſo much as A, which ſhould bee 36 pound: it is then 16 pound too little, ſay then A hath 7 pound, then B muſt haue 15 pound, for if B giue vnto A 4 pound, then are their moneys equall, but if A giue vnto B 4 li. then hath B 19 Pound, and A but 3 pound, and B ſhould haue 27 pound, it is then 8 pound too little, worke as the Rule leades, and you ſhall find 6 li. for A, and 14 li. for B.

The next queſtion is thus. A Goldſmith hath 2 ſilner Cups with one couer, which wayeth 33 ounces. Now if the couer bee ſet vppon the firſt Cup it is thrée times heauier then the other cup, but if the couer bee laid vpon the other cup it is foure times heauier then the firſt, the queſtion is how much each Cup wayed by it ſelfe.

Say

Say the firſt Cup wayed 15 Ounces, thereunto adde 33 ounces, they make together 48 ounces, which diuide by 3 it maketh 16 ounces, and that is 4 times as much as the firſt Cup, it is therefore 11 ounces too little, ſay then the firſt was 9 ounces, and worke according to your queſtion, you ſhall find for the firſt Cup 12 ounces, and for the ſecond Cuppe *facit.* 15 ounces. Now for proofe of the queſtion, you may adde the couer which is 33 ounces, vnto the firſt Cuppe which is 12 ounces, and they make 45 ounces, which diuide by 15 ounces the waight of the ſecond Cuppe, and you ſhall find it contained 3 times, then adde 33 ounces to 15 ounces it maketh 48 ounces; which diuide by 12 the waight of the firſt cup, and it is contained 4 times according to the queſtion.

The next queſtion is thus. Three Men haue bought a Shippe for 200 Pound: A will haue of B $\frac{1}{3}$ and then he will pay for the Ship, B will haue of C $\frac{1}{4}$ part, and he will pay for the Ship, C will haue of A $\frac{1}{5}$ part of his mouey, and he will pay for the ſhip: The queſtion is how much money each man had; Say A had 108 pound, which ſubſtract out of 200 pound there reſteth 92 pound, which is the $\frac{1}{3}$ of B money, then is B money 184 which ſubſtract frō 200 li. there reſteth 16 li. which is the $\frac{1}{4}$ part of C money, ſo is C money 64 li. and hee deſireth the $\frac{1}{5}$ part of A money which is 36 pound, and that being added to C money maketh but 100 pound, which ſubſtract out of 200 li. there is 100 li. too—little, ſay then A had 114 Pound, and worke according to the Rule. B muſt haue 172, C

112 li.

112 li. being wrought, it will make altogether 50 li. to little, then continue your worke as the Rule requireth, you ſhall find that A muſt haue 120 pounds, B muſt haue 160 li. C *facit.* 280 li.

The next queſtion is thus. Three Marchants haue bought a Houſe, which coſt 1200 pounds, whereof A deſireth of B and C $\frac{1}{2}$ parts of their money, then hee will pay for the houſe: B will haue of A and C $\frac{1}{4}$ parts of their money, then will he pay for the houſe, C will haue of A and B $\frac{1}{7}$ part of their money then hee will pay for the houſe: The queſtion is, how much money each man had? Say, A had 500 li. that ſubſtract from 1200, reſts 700 li. the $\frac{1}{7}$ part of B & C mony muſt be 700 li. then their money together was 2100 li. to that adde 500 li. of A money it maketh 2600 li. for A B and C, out of that ſubſtract 1200 Pounds, that A muſt giue for the houſe, reſteth 1400 li. which is as much as $\frac{1}{4}$ parts of A, and C money thereunto adde 466 pound $\frac{2}{3}$ as the $\frac{1}{4}$ part, for 1400 li. is the $\frac{3}{4}$ parts, then 466 $\frac{2}{3}$ muſt bee the $\frac{1}{4}$ part before you can haue the whole Summe of A and C money, which being added together is 1866 $\frac{2}{3}$ for A and C money. Now you ſay that A hath 500 Pounds, then C muſt haue 1366 $\frac{2}{3}$ which ſubſtract out of 2100 Pounds, B and C money, there reſteth 733 pound $\frac{1}{2}$, ſo much hath B, out of that ſubſtract $\frac{1}{7}$ that C requireth which is 104 pounds, $\frac{6}{14}$ which adde vnto the $\frac{1}{7}$ part of A Money which C will haue of him, which is 71 pound $\frac{3}{7}$ parts both being added together they make 176 pounds $\frac{2}{14}$ which adde vnto 1366 $\frac{2}{3}$ the money of C, and it maketh 1542 Pounds $\frac{5}{7}$ parts which ſhould bee but 1200 Pounds, therefore it is 342 pound $\frac{5}{7}$ × too much,

ſet

ſet therefore another number for A as 700 Pounds and worke as the Rule requireth, you ſhall find 342 pound $\frac{6}{7}$ —— to little, and in the continuance of your worke, you ſhall find *facit*. 600 Pound for A, for B *facit*. 800 pound, and for C *facit*. 1000 li.

For proofe of this queſtion, ſay A hath 600 pound then B hath 800 pound the $\frac{1}{3}$ is $266\frac{2}{3}$ C hath 1000 pound the $\frac{1}{3}$ thereof is 333 pound $\frac{1}{3}$ all added together maketh 1200 pound: Againe, B hath 800 pound, the $\frac{1}{4}$ of A is 150 pound, the $\frac{1}{4}$ of C is 250 pound, all being added together is 1200 pound: Againe, C hath 1000 pound, the $\frac{1}{7}$ part of A is 85 pound $\frac{5}{7}$, B hath 800 li. the $\frac{1}{7}$ part is $114\frac{3}{7}$ all added together is 1200 pounds, and thus you ſée the queſtion is anſwered according to the demand, and this ſhall ſuffice for this Rule, which I wiſh you would make practiſe thereof vntill you find your ſelfe able to anſwere to any ſuch queſtion howſoeuer it be propounded: The nert and laſt Rule that you ſhall learne, is the Rule of Ceries or Cerginum.

The

The Rule of Ceries or Verginum.

Theod. THere are 16 perſons, Men and Women that haue ſpent 57 pence, whereof a Man muſt pay 4 pence, and a woman 3 pence, the queſtion is how many Men, and how many women they were. To worke this or any ſuch like queſtion, ſet down your numbers that in money are ſpent by the ſeuerall perſons, and then ſubſtract the leſſer expence out of the greater, the remainor muſt be your deniſor, then Multiply the leſſer tearme of expence by the whole number of perſons: and ſubſtract that product out of the whole expence, the remainer, diuide by that number which you haue reſolued for deniſor; the quotient will giue you, how many there were of the greater tearme of expence: that ſubſtract out of the whole number of perſons, the remainer is ſo many as were of the leſſer terme of expence.

Iuni. You haue ſo plainely explained the manner of working this queſtion, that I doubt not but I ſhall bee able to worke this or any other queſtion ſo propounded, therefore I pray you let me worke it my ſelfe.

Example.

Example.

16 perſons. { a Man 4 d. / a Woman 3 d. } 1 deniſor.

3
48 57 money ſpent.
48
09 9 | 9 men. 16
9
7 wo:

Heere I ſubſtract 3 pence, out of 4 d. there reſteth 1 for deniſor, then I multiply 3 into 16 it maketh 48, which I ſubſtract out of 57, and diuide that remainer, by my deniſor I find there muſt bee 9 Men, whoſe expence is 36 pence, which 9 I ſubſtract out of 16 pence, there reſteth 7 Women, whoſe expence is 21 pence, which being added together maketh the iuſt Summe of 57 pence.

The next queſtion is thus. There are 24 perſons, Men, Women, and Children, that ſpend 43 ſhillings, whereof a man muſt pay 3 ſhillings, a woman 2 s. and a child 8 pence, the queſtion is to know how many men, women & children there were ſeuerally

Iuni. To proſecute my worke, I firſt multiply the number

number of persons by the least tearme of expences, thē doe I put 43 shillings into pence; and because there are 3 sorts of persons mentioned, I take the third part of the number of pence that is in the 43 shillings and adde vnto it, then I subtract the number of pence produced of the first multiplication therefrom, and proceād according to the maner of the rule as before is shewed.

Example.

24 persons.	43 s.		688	
8	12		192	
192	86		496	x
	43			86 | 4 women.
				24
48 | 40	516		496 | 10 Men.	
32 | 24	172		480	
8	688		4	
			. 24	
			14	
			10 Children.	

I answere, there must bee 10 Men, 10 Children, and 4 women.

Theod. The nert question I demaund of you is this. A man hath 3 sorts of Siluer, the first of 7 pence fine, the second of 9 pence fine, the third of 11 d. fine the marke

Marke, of these 3 sorts he would make a pece of worke of 20 markes, which shall hold 10 penny waight of fine the one with the other, the question is how much he shall take of each sort.

Iuni. I shall resolue you of this question presently, God willing.

Example.

	d.			
20	11	4	200 d. make 20 Marks of Sil.	
7	9	2	140	10 d. waight fine.
140	7		60	

20	1		
14	2	2	
6	6 0	12	Markes at 11 d. fine.
	4 4	6	Markes 9 d fine.
2 2	2	2	Markes 7 d. fine.
6			

I answere, 12 Markes of 11 d. fine, 6 Markes of 9 d. fine, 2 Markes of 7 pence fine, if you cast them vp at those rates, they make iust 200 pence.

Theod. The next question I will demaund is thus. A man hath 200 pence to bestow, for the which he will haue Fowle; as Geese, Blackebirds, and Finches, whereof one Gose is 10 d, a Blackebird 2 d, and 10 Finches for 1 d, the question is, how many Geese, Blackbirds, and Finches he must haue.

Iuni. I will giue you a solution of this question, thus.

Example.

100	10 ℔.	100	99	200	100
1	2	20	19	10	20
100		1		2000	80 Fin.
				100	
				1900	

✠ 1			
299			
✠99ø	19 Gæſe.	✠9	1 Blackbird.
999		19	

I anſwere, 19 Gæſe, 1 Blackbird, and 80 Finches, which if I ſhould rate at their prizes, they make iuſt 200 pence.

Theod. It is well anſwered, I will now propound vnto you one other queſtion, and ſo will conclude, that is thus: A Marchant hath bought 24 li. of Spice, for 48 ſhilling, that is to ſay, Pepper, Ginger, and Sugar, 4 li. of Pepper coſt 9 s. and ſo much coſt 6 li. of Ginger, and 9 li. of Ginger coſt as much as 12 li. of Sugar, the queſtion is, how much of each ſort he bought?

Iuni. This queſtion ſéemeth vnto mee very difficult: Yet I pray you giue mee leaue to conſider how it may be wrought, which I take it to be thus. Séeing that 9 pound of Ginger coſt as much as 12 pound of Sugar, therefore I ſay if 6 li. of Ginger coſt 9 s. what will 9 li. coſt, *facit.* 13 s. $\frac{1}{2}$, ſo much alſo coſt the 12 li. of Sugar. Now will I ſéeke how much 1 li. of each ſort coſt apart, ſaying; Firſt, if 4 li. of Pepper coſt

coſt 9 ſ. what ſhall 1 li. coſt? *facit.* 2 ſ. $\frac{1}{4}$: now if 6 li. of Ginger coſt 9 ſ. what ſhall 1 coſt? *facit.* 1 ſ. $\frac{1}{2}$. Againe, if 12 li. of Sugar coſt 13 ſ. $\frac{1}{2}$, what ſhall 1 li. coſt? *facit.* 1 ſ. $\frac{1}{8}$ part. Now I will ſet it as the Rule requireth.

Example.

24	2	$\frac{1}{4}$	18	9	48 ſ.	384	24
9	1	$\frac{1}{2}$	12	3	8	216	20
216	1	$\frac{1}{8}$	9		384	168	4

76
168 | 18 li. of Pepper.
99 2 li. of Ginger.
4 li. of Sugar.

I anſwere, he bought of Pepper 18 pounds, of Ginger 2 pounds, and of Sugar 4 pounds, which if you caſt vp by their ſeuerall prices, will amount iuſt to 48 ſhillings.

FINIS.

THE SECOND PART OF ARITHMETICKE,

Containing the Extraction of Rootes, with an Introduction into Coſsicke numbers.

Iunius. Sir, ſo it is, that hauing now ſpent ſome time in the practiſe of the former part of vulgar Arithmeticke, wherein hauing by Gods aſsiſtance and your good furtherance, reaſonably well profited to my great good and exceeding pleaſure. I am bold now alſo to intreat your further helpe for my attaining to the extraction of Rootes, and the Art of Coſsicke numbers.

Theod. I commend your diligence, and being that I ſée you are ſo willing to learne, I will doe my beſt indeauour for your furtherance.

Iuni. Then briefely, I pray you explaine firſt vnto me what the extraction of Rootes is.

Theod. Firſt know, that of Roots there are diuers kinds, which doe receiue their names from the quantities to which they doe belong: as Squares, Cubes, ſquared

Squared ſquares, Surſolides, &c.

Iuni. What is a ſquare and cube number, with their Roots.

Theod. A ſquare number is the product of any number multiplyed in it ſelfe, whoſe Roote or beginning is the number, which being ſo multiplyed into itſelfe, produceth the ſaid ſquare number; as 36 is a ſquare number being produced of 6, multiplyed by it ſelfe, for 6 times 6 is 36 a ſquare number, and 6 by which the ſaid ſquare number is produced, is the ſquare roote thereof. A Cubicke number is the product of any number twiſe multiplyed into it ſelfe, and the number by which the ſaid product is increaſed is the Cube roote thereof, as 27 is a cubicke number whoſe roote is 3, for 3 times 3 is 9 a ſquare number, and 9 againe by 3 is 27 a cube number, and the number 3 by which the ſaid cube is produced, is the roote thereof.

Againe, a ſquared ſquare number is the product of any number multiplyed 3 times into it ſelfe, whoſe multiplyer is the roote thereof, as 16 is a ſquared ſquare number whoſe roote is 2, for 2 times 2 is 4, againe, 2 times 4 is 8, and thirdly 2 times 8 is 16, and ſo may you proceed infinitely from quantie to quantity, but ſeldome ſhall you haue any great vſe for the extracting the rootes of any more quantities then the firſt, ſecond, third, and fourth; notwithſtanding, for your better eaſe in conceiuing the true nature and deriuation of moſt ordinary quantities with their roots, behold this table containing the Rootes and numbers of 10 ſeuerall quantities, beyond which you ſhall neuer haue any vſe, where you ſee that 1024 is a ſquare of ſurſolids.

1	Rootes	2	3	4	5	6	7	8	9
2	Squares.	4	9	16	25	36	49	64	81
3	Cubes.	8	27	64	125	216	343	512	729
4	Squared squares.	16	81	256	625	1299	2401	4096	6561
5	Surfolides.	32	243	1024	3125	7776	16807	32768	59049
6	Squares of Cubes.	64	729	4096	15625	46656	117649	262144	531444
7	Second Surfolides.	128	2187	16384	78125	279936	823543	2097152	4782969
8	Squa. of squared squares.	256	6561	65536	390625	1679616	5764801	16777216	43046721
9	Cubes of Cubes.	512	19683	262144	1953125	10077696	40353607	134217728	387420489
10	Squares of Surfolides.	1024	59049	1048576	9765625	60466176	282475249	1073741824	3486784401

or of the tenth quantity and the roote thereof is 2, and the like may be vnderſtood of the reſt.

Iuni. All this I reaſonably well vnderſtand, ſo farre foorth as to ſpeake of Roots, quantities, and numbers, for I ſée that if the quantity bée ſurſolids and the number 1024, then is the ſurſolid roote thereof 4, but if the quantity be ſquares of ſurſolids and the number 1024, then is the roote therof but 2: But for the nature, reaſon, and vſe héereof, I am altogether ignorant.

Theod. For the reaſon of theſe quantities, know this, that a roote is the ſide or beginning of any other quantity, and béeing vnderſtood to bee a quantity it ſelfe, then doth it repreſent onely a line hauing length without breadth or thicknes: But if it bée a ſquare, then is it to be vnderſtood to be a ſquare figure, hauing length and breadth: and if it be a Cube, then is it to be vnderſtood to conſiſt of length, breadth, and thicknes: as for your better inſtruction, if you take a foote in meaſure onely, it containeth 12 inches ſimply: but if it haue breadth according to the length, then is it a iuſt ſquare containing 144 inches, which is 12 times 12: Againe, if it haue thicknes correſpondent to the length and breadth, then is it a right Cube hauing in the whole contents 1728 inches, which is 12 times 144: theſe things thus well conſidered, will the more eaſily giue you light to the conceiuing of the reſt, which for breuity ſake I will leaue you to conſider of at your better leaſure.

Iuni. I make no doubt, but by this light which you haue giuen mee, to conceiue well of it. Now therefore, if you thinke good to explaine the vſe thereof,

I ſhall bée attentiue.

Theod. Hauing ſhewed you of Rootes, quantities, and their numbers, it reſts now, to ſhew how from any number giuen, to extract the roote according to the quantity required, viz. What number by the firſt, ſecond, or third multiplication, will produce the ſaid number giuen: as if it be ſuppoſed a ſquare number to finde the ſquare roote: and if a Cube number to finde the Cube roote, of which 2 onely as béing chiefly in vſe, wée will now intreat the vſes that theſe extractions ſerue for, ſhall be ſhewed afterward in their conuenient places.

And firſt, to extract the ſquare roote of any number, you muſt ſet downe your number, and beginning at the laſt figure towards your right hand, put a pricke vnder it, and then leauing one vnpricked, put another pricke vnder the next, and ſo throughout, leauing betwixt each pricke one figure vnpricked, and hauing ſo done, draw a quotient as in diuiſion. Where you muſt note, that leke how many pricks are vnder your giuen number, ſo many figures muſt there be in the quotient, for the ſquare roote of the ſaid number.

Iuni. I pray you, let mée trye whether I conceiue you right or not, I propoſe a giuen number to be 53824, which I ſet downe with a quotient, & vnder each ſecond figure a pricke thus, but what to do with it now, I am altogether ignorant.

5 3 8 2 4 |__

Theod. You haue done well, and now will I ſhew you how to find out figures to put into your quotient for the roote of the ſaid number, but firſt I thinke it néedfull for you to know what ſquare number each of the

the 9 vnities make, being that you ſhall haue vſe thereof in your extractions, for the knowledge whereof this little table wil eaſe you, where you ſee that right againſt each of ỳ 9 vnities towards the right hand ſtands the Square thereof, this known to find the rote note what figure is ouer the firſt pricke towards the left hand, and marke withall the greateſt ſquare number in the ſaid figure, with the rote thereof: which ſquare number take from the ſaid figure, and cancelling the figure ſet the remainer ouer it as in diuiſion, and put the rot of the ſquare number ſo taken from it in your quotient, for the firſt figure of your rote, as in your example: ouer the firſt pricke is 5, in which the greateſt ſquare is 4, whoſe rote being 2, I put in the quotient for the firſt figure of the rote, and taking 4 the ſquare of 2 from 5 reſts one, then will the worke ſtand thus.

1.	1
2.	4
3.	9
4.	16
5.	25
6.	36
7.	49
8.	64
9.	81

1

5 3 8 2 4 | 2

And now to find the next figure of the rote, you muſt double the quotient, and ſetting that double in the next ſpace towards the right hand, ſeeke how often it may be found in the numbers ouer it, the quantity thereof muſt be put in the quotient for the ſecond figure of the rote, but with this proviſo, that you take it no oftner then that the ſquare thereof may be alſo taken from the figure belonging to the next pricke, as in this example the quotient is 2, that doubled is 4, which I ſet in the next ſpace vnder 3 which may bee had in 13 the number

ouer

ouer it 3 times, ſo I ſet 3 in the quotient for the ſecõd figure of the rote, ſubſtracting 3 times 4 which is 12 from 13 reſts 1, then I cancell 13 and ſet 1 ouer 3 for remainer, which with 8 that ſtands ouer the next pricke makes 18, from which ſubſtracting the ſquare of 3 the laſt figure in the quotient and there reſts 9, ſo haue you now 2 figures in your quotient of the rote, and the worke ſtanding in this order: and now to find the third and laſt figure of the rote, for this is a generall rule ỳ ſo many prickes as are vnder your giuen number, ſo many figures muſt the rote conſiſt of, to find which third figure you muſt double the whole quotient already found, and ſet it in the next ſpace vnder 92, ſeeking as before how often it may be taken from the ſaid number ouer it, and ſubſtracting the ſame one from the other; ſetting the quantity of the times ſo taken from it in the quotient, ſubſtract alſo the ſquare of the figure in your quotient from the number remaining ouer the laſt pricke, and if nothing remaine, then is the number giuen a right ſquare number, and the quotient ſo found is the rote thereof, as heere doubling 23 it makes 46, which I ſet in the nert ſpace forward, and ſeeking how often 46 may be had in 92 the number ouer it, I ſee that it may be had therein 2 times, and nothing will remaine, therefore I ſet 2 in the quotient, and ſubſtracting the ſquare therof, which is 4 from 4 the number ouer the laſt pricke, there will reſt nothing likewiſe; whereby

129						
8	3	8	24	1	23	
	4					
129						

129						
8	3	8	24	1	232	
	446					
129						

by I conclude that 53824 is a ſquare number, and 232 is the ſquare rote thereof; for triall whereof if it be rightly done, multiply 232 ſquarely into it ſelfe, and the former ſumme of 53824 will be produced, the whole worke ſtanding as aboue.

xxg
53824 | 232
4464 | 232
129
464
696
464
53824

Iuni. Surely you haue laid downe the manner of ỹ worke ſo plainely, that mée thinkes it ſéemes ſo eaſie, as I doubt not but that now I could extract the ſquare rot of any number my ſelfe, without any further inſtruction.

Theod. You ſay well, and if you can performe it I ſhall thinke very well of my labour beſtowed vpon you, therefore to try your cunning, let me ſée how you can extract the ſquare rote of this number 11716925, and while you are doing of it, I will giue you the loking on.

Iuni. Firſt then, according to your example, I ſet downe the number with pricks vnder each ſecond figure from the right hand towards the left thus, with a quotient, 11716929|__ where I note as you told me that the rote of this number muſt conſiſt of 4 figures, becauſe there are 4 pricks vnder the giuen number: and now to finde out the ſaid figures, I ſéeke the greateſt ſquare number in 11, which is the figure belonging to the firſt pricke, which greateſt ſquare therin contained is 9, béeing compoſed of 3 times 3, therefore I ſet 3 the rote in the quotient for the firſt figure of the rote, and

and ſubſtracting the ſquare thereof 9 from 11 reſts 2, which I ſet ouer head cancelling 11, the worke being as you ſee, then for the ſecond figure of the rote I ſet 6,

2
xx71692913
9

the double of the rote yet found, in the next ſpace forward vnder 27, and ſeeking how often I may haue 6 in 27, I ſee that 6 is contained therein 4 times, and 3 remaines therfore, I ſet 4 in the quotient for the ſecond figure of the rote, and cancelling 27, I ſet 3 the remainer ouer it, which with 1 the figure ouer the next pricke makes 31, from which alſo I take 16 ỹ ſquare of 4 being the figure laſt ſet in the quotient, and then there reſts 15 ouer the ſaid ſecond pricke, the whole worke ſtanding thus.

1
xx3 5
xx7x6929 |34
96
16

Then againe for the third figure of the rot in ỹ next ſpace forward, I ſet downe 68 the double of 34 the figures of the rote yet found and ſeeke how often 68 may be taken out of 156 the figures remaining ouer ỹ ſame, which may be done 2 times, for 2 times 68 is 136, therefore I put 2 in the quotient for the third figure of the rote, and ſubſtracting 136 from 156 reſts 20, which with 9 the figure ouer the third pricke makes 209, from which alſo the ſquare of 2, the figure laſt found being taken, leaues 205: ſo now haue I 3 figures of the rote, the worke ſtanding as is aboue ſhewed. And now to find the fourth and laſt figure of the rote in the

x 2
xx3x505
xx7x6926|342
96
16
68

nert

next ſpace forward I ſet downe 684 the double of the rote as yet found, and ſéeking how often 684 may be taken out of 2052, the number remaining ouer it I ſée that it may be taken thereout 3 times, for 3 times 684 is 2052, which deducted the one from the other leaues 0, therefore I ſet 3 in the quotient for the fourth or laſt figure of the rote, whoſe ſquare being 9, and taken from 9 the figure ouer the laſt pricke, leaues likewiſe 0, whereby I finde 11716929 to bée a ſquare number, and the rote thereof to be 3423, for proofe whereof I multiply 3423 by it ſelfe ſquarely, as you taught mée, and I ſée the firſt number propoſed 11716929 to bée produced as the worke moſt euidently appeareth.

Theod. You haue very well done, and I greatly commend your diligence in practiſe, as alſo your aptneſſe in the conceit thereof, for I make no doubt but ỹ as you haue thus readily wrought theſe 2 queſtions, you will eaſily with little practiſe extract the ſquare rote of any number being a right ſquare number.

Iuni. Is there then more difficulty in extracting the ſquare rote of any other number being not a right ſquare number.

xx	
2352	
xx7x6929	3423
96	
16	
684	
6849	
3423	
3423	
10269	
6846	
13692	
10269	
11716929	

Theod.

Theod. The difficulty in worʒking is not much but onely in this, that if it be not a right ſquare number, then the true rote thereof cannot be exactly found, and therefore you beſt indeauour muſt be to finde the nærreſt rote, and that may haue the leaſt erroʒ, foʒ the effecting whereof diuers writers haue ſeuerally written their opinions, and by their great and commendable labours haue brought it to a nærenes of truth (but yet not to an exactnes) and therefore what hath bæne written you muſt content your ſelfe to learne.

Iuni. I thinke that I doe vnderſtand your meaning to be thus, if 45 be a giuen number, of which ỹ ſquare rote is required, I ſee that the greateſt ſquare number therein contained is 36, whoſe ſquare rote is 6, which 36 being dedncted from 45, leaues 9, whereby I perceiue that 6 is to little to be the ſquare rote of 45, and if I ſhonld take 7 to be ỹ rote, 7 times 7 is 49, which is to much by 4, and therefore how to finde the nærreſt rote I am ignoʒant, vnleſſe 7 be the nærreſt, becauſe the difference is leſſe then the other.

Theod. I cannot but commend your quicke conceit in the apprehenſion, but yet you are farre from the truth, foʒ whereas you count the difference of 4 vnities to be the leaſt erroʒ, we account it a great erroʒ if we find not the true rote within the $\frac{1}{10}$ part of an vnitie, which nearreſt Rote is thus found, accoʒding as Tartaglia that learned Mathematician teacheth: hauing extracted your nearreſt Rote in whole numbers, marke the remainer of the number giuen, and the rot already found as in your laſt propoſed example, where the nærreſt rote of 45 is required, you ſee that the greateſt ſquare number therein is 36, which taken from

from 45, leaues 9 for the remainer, and 6 for the nereſt roote yet found: but now for the nereſt roote in deede make a fraction of your remainer and roote, ſetting the remainer for numerator, and the roote found double for the denominator, ſo ſhall you haue $6\frac{1}{4}$ for your roote found, which being multiplyed ſquarely is $45\frac{9}{16}$ which is too much by ſomewhat more then $\frac{1}{7}$ an vnity, and therefore for to come to a more nere exactnes of the true roote by Tartagliaes Rule, as I ſayd multiply the roote nereſt found ſquarely, and from thence ſubſtract the firſt number giuen, as here your nereſt roote yet found is $6\frac{1}{4}$, the ſquare whereof is $45\frac{9}{16}$, from which taking away 45 reſts $\frac{9}{16}$, which muſt be diuided by the double of $6\frac{1}{4}$ the roote yet found, which double beeing $\frac{27}{2}$, and diuiding $\frac{9}{16}$ by it, the quotient is $\frac{9}{216}$ which taken from $6\frac{1}{4}$ the roote before found, leaueth $6\frac{111}{216}$ for the nereſt ſquare roote of 45. for tryall whereof if you will at your leaſure multiply $6\frac{111}{216}$ into it ſelfe ſquarely, the product thereof will be $45\frac{9}{1296}$ which is not fully the 550 part of an vnity different from the firſt number giuen, which in my opinion can breed no great error in extracting the nereſt roote of any number whatſoeuer.

Iuni. This ſeemeth more intricate vnto me as yet, then any thing that you haue hitherto ſhewed me, and therefore for my further inſtruction I pray you propoſe ſome other ſuch like queſtion, and I will doe my beſt indeauor for the reſoluing thereof.

Theod. You ſay well, let 22 bee a giuen number, of which I would haue you giue me the nereſt ſquare Roote.

Iuni. Firſt, I ſee that the greateſt ſquare number in

in 22 is 16, which taken from 22 leaues 6, which as you taug't me I ſet for numerator, and the rote of 16 being 4, the double thereof being 8, I ſet for denominator, ſo haue I for the rote ordinary $4\frac{6}{8}$ or $4\frac{3}{4}$, but now to bring it to a nerer rote I multiply $4\frac{3}{4}$ into it ſelfe ſquarely, and the product thereof is $\frac{361}{16}$ or $22\frac{9}{16}$, now taking away 22 reſts $\frac{9}{16}$, which I diuide by $\frac{9}{2}$ the double of $4\frac{3}{4}$ the rote yet found, and the quotient is $\frac{18}{152}$ or $\frac{9}{76}$, which ſubſtracted from $4\frac{3}{4}$ the rote formerly found leaues $4\frac{301}{76}$, which if I haue done right is the neareſt ſquare rote of 22, for proofe whereof I multiply $4\frac{301}{76}$ ſquarely and the product thereof is $\frac{5041}{304}$ or $22\frac{33}{304}$, which is but little more then the 285 part of an vnity more then the firſt giuen number, which being ſo ſmall I take the error to be vnſenſible, and therefore I thinke that with theſe your inſtructions and my further practiſe, I ſhall grow to perfection in the extracting of the ſquare rote of any number whatſoeuer: it reſteth now, that you will likewiſe ſhew me to what vſe the ſquare rote ſerueth.

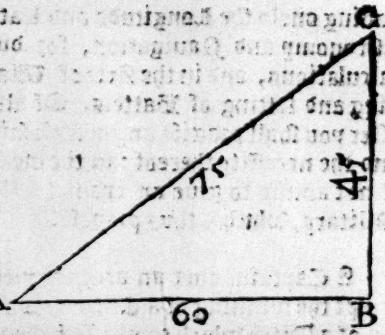
Theod. Surely, the vſes that are made of the ſquare rote are ſo manifold, that to explaine them at large would be very tedious, onely let it ſuffice that the ſquare rote is required in moſt Arts and Sciences Mathematicall: as in Arithmeticke, Geometry, Coſmographie, Aſtronomie, and Nauigation. In Arithmeticke, as being a principall part and member thereof. In Geometry, for finding the ſides, Angels, &c. of figures for meaſuring of land, taking diſtances, heights, &c. In Coſmography, for the knowing the diſtance from one place to another, how farre ſoeuer a ſunder, hauing

having onely the Longitude and Latitude giuen, in Aſtronomy and Nauigation, for diuers and ſundry calculations, and in the Arte of Warre, for the ranging and ſetting of Battels. Of all which as hereafter you ſhall practiſe any of theſe ſaid Arts, you ſhall find the neceſſity thereof: in the meane time I thinke it not amiſſe to giue an example Geometricall and Military, which I thus propoſe.

A Captaine ouer an army of men, being to attempt the winning of a Cittie: So it is, that by reaſon of a Ditch which compaſſeth the walles thereof, he cannot come nere the walles to place Ladders thereto for to take it, neither can hee geſſe any thing nere of what length to make a Ladder, that may iuſtly reach from the banke of the Ditch to the top of the wall, onely thus much, by his Geometricall Inſtrument hee hath found out the breadth of the ditch to bee 60 foote, and the height of the wall to be 45 foote: By which height and breadth knowne, with helpe of the ſquare rote, the Hipothenuſall or diſtance from the banke of the Ditch to the toppe of the Wall, is thus found; Multiply the breadth and height each by it ſelfe ſquarely, and adding both the products together, from the totall extract the ſquare rote, which rote ſo found

is

is the hipothenuſiall diſtãce required, as for your better inſtruction, ſuppoſe in this tryangle the ſayd A B to be y breadth of the ditch 60 foote, and B C the Height of the wall 45 foote, the queſtion now to be anſwered is to know the length of the line, A C which is the Hypothenuſiall diſtance from the Banke of the Ditch to the top of the Wall: To know which, firſt I multiply 60 into it ſelfe, and the product is 3600, then I multiply 45 into it ſelfe, and the product is 2025, theſe 2 products being added together make 5625: of the which the ſquare roote extracted according to the method before taught is 75, whereby I conclude that the hipothenuſiall diſtance is 75 foote for the line A C, of which length the Ladder muſt bee which ſhall reach from the banke of the ditch to the toppe of the Wall, which if you think good at your better leaſure to make tryall of, you ſhall find the truth thereof: many other examples I could lay open vnto you, wherein the excellent vſe of the ſquare Roots is required. But time being precious and paſſeth away like a ſhaddow, I will not trifle away much thereof about it, but thinke it ſufficient that you know how to find the ſquare roote of any number whenſoeuer you ſhall haue vſe thereof,



which

which in practiſing the Mathematicall ſciences you ſhall find to be manifold.

Iuni. Truely Sir as before, I was glad that I could ſo eaſily attaine to the knowledge how to extract a ſquare Roote. So now am I as it were raviſhed with ioy, that thereby I ſhall bee able to worke ſuch excellent and neceſſary matters, for the attaining to the knowledge whereof, by Gods aſſiſtance, I will omit no time in the reading of ſuch Bookes as will direct me to the further vſe of this and ſuch like, which by your good and willing indeauours I ſhall find my ſelfe capable of, and therefore I beeing as vnwilling as your ſelfe to loſe any time from ſo good an exerciſe, if now you thinke good to proceed to the next thing to bee learned, which as I remember you ſayd was the extraction of a Cube roote from any number giuen, I will be attentiue.

Theod. I ſee you doe not ſodainely forget that which is for your owne good, but before wee come therto, take theſe few rules for the better help of your memory, which were inuented by Goſſelin a louight-er vpon Tartaglia, whereby readily to know whether a number giuen be a right ſquare number or not, by the laſt figure of the number giuen ſaue one.

Firſt, the vnity maketh no ſquare number but before 6, as in 16.

Secondly, 2 makes no ſquare number, but before 1.4.5. and 9. as in 121.324.25. and 529.

3. makes no ſquare number but before 6, as in 36.

4. but before 1.4 and 9. as in 441. 144. & 49.

5. but before 6, as in 256.

6. but before 1. 4. and 9. as in 361. 64. & 169.

7. but before 6 as in 576.

8. makes no ſquare number, but before 1. 4. & 9. as in 81. 484. and 289.

9. but before 6, as in 196.

0. makes no ſquare number, but before himſelfe 4. 9. & 1. as in 100. 3304. 2209. 2401.

To extract the Cubicke roote of any number giuen.

TO find out the Cubicke roote of any number, as for the ſquare roote, your giuen number being ſet downe with a quotient and a pricke ſet vnder the firſt figure toward the right hand, and leaning one vnpricked, ſet a pricke vnder each other, ſo for the Cube roote you muſt alſo begin at the right hand, putting a pricke vnder the firſt figure: and whereas you left in the ſquare number one figure, heere you muſt leaue 2 ſetting a pricke vnder each third figure, and as before loke how many prickes is vnder your giuen number, ſo many figures muſt your Cubicke roote conſiſt of, and being ſo ordered to find out the figures of the roote, firſt ſeeke the greateſt Cubicke number contained in the figure or figures belonging to the firſt pricke toward the left hand, and ſubtracting the ſaid Cubicke number therefrom, ſet the Cube roote thereof in the

quotient,

quotient, and the remainer ouer the ſaid figures belonging to the firſt pricke: and for your further eaſe in knowing the Cube numbers with their Rootes for the 9 vnities, which is very needfull to be knowne by memory, this little table will inſtruct you, being that right againſt euery vnity is his particular cubick number.

1.	1
2.	8
3.	27
4.	64
5.	125
6.	216
7.	343
8.	512
9.	729

Now to proceede, hauing found out the firſt figure of the roote, you muſt triple the ſaid figure ſo found in your quotient, which triple you muſt ſet vnder the next figure towards the right hand of the firſt pricke, that triple muſt you multiply by the quotient, ſetting the product thereof vnder the ſaid triple, which product you muſt ſeeke how often will be found in the figures remaining ouer, and to the left hand thereof with this prouiſo, that you take it therein no oftner, but that the ſaid number being ſet in the quotient, for the ſecond figure of the roote, multiplied firſt by the diuiſor or number ſet vnder the triple of the firſt figure, and againe the ſquare of the ſaid ſecond figure by the triple, and laſtly the cube of the ſecond figure all being ſet one vnder another, each of them being ſet one figure more toward the right hand thē the other, and added together may bee taken from the figures remaining or belonging to the next pricke toward the right hand. Which ſo ſubſtracted; and the remainer noted ouer head, to find the third figure of the roote you muſt doe with all the quotient yet found in all reſpects as you did with

the firſt for the finding of the ſecond, and ſo with the reſt, if you haue any more prickes, where you muſt note that after your laſt worke if nothing remaine, then is your number a right cubicke number, and the quotient is the Cube Roote thereof.

Iuni. Truely this ſeemeth ſo difficult vnto me, by this your declaration in wordes, that vnleſſe you explaine it more plainely by an Example, I am doubtfull that I ſhall hardly vnderſtand the manner thereof.

Theod. Then marke the worke of this propoſed number of 12487168, of which I would extract the Cubicke Roote, to doe which, firſt I ſet downe the propoſed number with a quotient, ſetting a pricke vnder the laſt figure on the right hand, and leauing 2 figures vnpricked, I ſet another pricke vnder the Fourth figure towards the left hand, and leauing 2 more vnpricked from vnder the third, thence doe I ſet a third pricke, the worke ſhewing in this manner with three pricks vnder it, whereby I ſee that

12487168|
. . .

the Cube Roote of this giuen number, muſt conſiſt of 3 figures to be found out as aforeſayd, thus. Firſt I ſeeke what the greateſt Cube number of 12, the number ouer the firſt pricke on the left hand is, which I find to be 8, whoſe Cube Roote is 2, therefore I ſet 2 in the quotient for the firſt figure of the Roote, and ſubſtracting the Cube thereof 8 from 12, ſet 4 the remainer ouer head, and to find the ſecond figure of the Roote, I proceed in this order, in the next ſpace to the

right

right hand of the firſt pricke I ſet 6 the triple of 2, the figure yet found, that triple I multiply by 2, and the product being 12, ſet vnder the triple 6 as you ſée is the next deuiſor, therefore I ſéeke how often I can haue 12 in 44 the figures ouer it, which I take 3 times, ſetting 3 in the quotient, for the ſecond figure of the Roote, and drawing a line vnder the deuiſor, I ſet the product of the ſayd diuiſor multiplyed by 3 vnder the ſame: Then I multiply 9 the ſquare of 3 by the firſt triple 6 ſetting that vnder the former, and laſtly I ſet 27 the cube of 3 vnder the others, which ſet in this order as is héere ſhewed & added together, the totall is 4167, that ſubſtracted from 4487 the figures belonging to ỹ ſecond prick leaues 320168 for the laſt prick. And now for to find the 3 & laſt figure of the root, I ſet downe the triple of 23 the roote yet found which is 69, the laſt figure thereof vnder the next ſpace toward the right hand, and vnder the ſame the product of the quotient multiplyed by the ſayd triple, which product being 1587, I ſéeke how often it may be had in 3201 the figures directly ouer it, which I take 2 times, therefore ſetting 2 in the quotient for the third

```
  4
 12487168 | 2
   6
  12

 4320
 12487168 | 23
   6
  12
  36
   54
    27
  4167
```

and laſt figure of the Root, and drawing another line, vnder it I ſet 3174 being the product of the deuiſor 1587 multiplyed by 2 the laſt figure of the quotient, then vnder it I ſet 276 the product of 96 the laſt triple multiplyed by 4 the ſquare of 2 the laſt figure of the quotient, and laſtly I ſet 8 the Cube of 2 one figure more forward, & the whole ſet in order as you ſee and added togeather makes 320168, which being equall to the figures reſiding to the laſt pricke and taken therefrom reſts nothing, whereby I conclude 12487168 to be a right Cubicke number, and 232 to be the Cube Root thereof, as if you will multiply 232 into it ſelfe cubickely, you ſhall ſee that the firſt giuen number will be produced.

```
                4320
12487168|232
        8
   43 | 69
   36 | 1587
   54
   27
 4167
 3174
  276
    8
320168
```

Iuni. Sir, your paines being ſo great in explaining it, and the example ſo plainely propoſed, I cannot but thanke you for your paines, and conceiue of your meaning, for I ſee that the working is no more difficult then of other rules, but onely ſo many rules to be remembred as require a good memory, or elſe often practiſe, which is the onely thing that in all Artes breeds perfection: And therefore to try how I haue profited by your Example, I pray you propoſe another Cubicke number, and I will doe my beſt indea-

uor

for to find the Roote thereof.

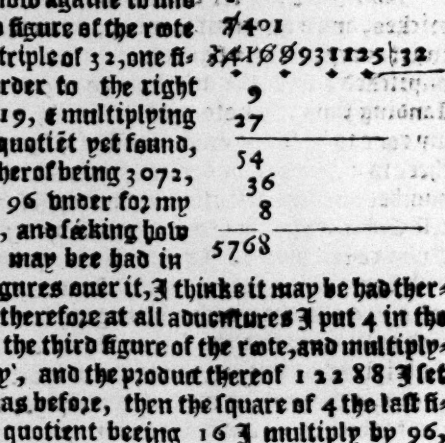
The. Well, then at your request let 34169931125 be a giuen nũber, of which I wold know ẏ cube roote.

Iuni. First, I set downe the sayd number with prickes, and a quotient leaning as you shewed me betwixt euery pricke 3 figures.

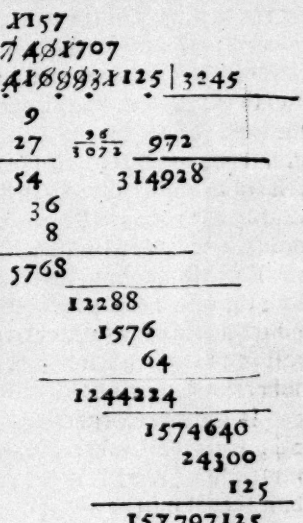
vnpricked, and the worke standing thus, I note that my roote to be found must consist of 4 figures, because there is 4 prickes vnder my giuen number, and the number ouer the first pricke being 34, I seeke the greatest Cubicke number in 34, which being 27, whose Cube roote being 3, I put 3 in the quotient for the first figure of the roote, and substracting 27 from 34 rests 7169 for the number belonging to the next pricke. And now for to find the second figure of the roote I set the triple of 3 which is 9 in the next space vnder the figure 1, ẏ the product thereof multiplyed by 3, ẏ quotient which is 27 vnder it for my deuisor in this order. Then I seek how often I may take 27 out of 71 the nũber ouer it which may be done but 2 times therefore I put 2 in the quotient for ẏ second figure of ẏ roote, ẏ drawing a line vnder 27 my deuisor the product therof multiplied by 2 I set vnder the line which is 54. Again, I multiply ẏ square of 2 which is 4, by 9 the triple of 3, and ẏ product 36 I set vnder 54 one figure more to the right hand, and lastly, one place more to the right hand I set 8 the cube of 2, and then adding them altogether the product is 5768, which taken from 7169 the figures belonging to the second pricke, leaues

```
3 4 1 6 9 9 3 1 1 2 5 | _____
  .   .   .   .
  9
 27
```

leaues 14019 31 for the figures belonging to ỹ third pricke, and so haue I 32 for the 2 first figures of my Roote, the worke beeing in this order. And now againe to find out the third figure of the roote I set 96 the triple of 32, one figure forwarder to the right hand vnder 19, & multiplying by it 32 the quotiēt yet found, the product therof being 3072, I set downe 96 vnder for my new deuisor, and seeking how often 3072 may bee had in 14019 the figures ouer it, I thinke it may be had therin 4 times, therefore at all aduentures I put 4 in the quotient for the third figure of the roote, and multiply 3072 thereby, and the product thereof 12288 I set vnder a line as before, then the square of 4 the last figure of the quotient beeing 16 I multiply by 96, and the product thereof 1536 I set vnder it one figure forwarder to the right hand, which with the Cube of 4 beeing 64 set vnderneth in the like order & added together, the totall thereof beeing 1244224 substracted frō the figures belonging to the third prick, leaues in all 157707125 for the figures belonging to the fourth



fourth and laſt pricke, and ſo hauing 324 for the 3 firſt figures of my Roote, to find the fourth I triple the ſaid quotient, which triple being 972, I ſet one figure forwarder toward the laſt pricke which is vnder 071, and multiplying the quotient therby, the product therof 314928, I ſeek how often it may be had in 1577071 the number ouer the laſt triple which may bee had 5 times, therefore I put 5 in the quotient for the fourth and laſt figure of the Roote, and multiplying 314928 by 5, the figure laſt put in the quotient, the product being 1574640, I ſet downe vnder a line. Againe I multiply the ſquare of 5 which is 25, by ỹ laſt triple 972, which product being 24300, I ſet vnder it as before, and laſtly vnder the ſame I ſet the Cube of 5 which is 125 and the ſaid 3 numbers being added together as here you ſee, the total product thereof is 157707125 which being ſubſtracted frō the nūber belonging to the laſt pricke, leaues nothing, in which reſpect I perceiue that the ſayd giuen Number of 34169931125 is a



right

right Cubicke number and the cube Rwte thereof is 3245.

Theod. Your conceit is gwd, and your wwrke is well performed, in which respect I thinke it needlesse to spend any more time about the extracting of ỳ square or cubicke Rwte, onely this, I will shew you how to extract the nearest cube Rwte of a number not being a right cubicke number, as also to extract the square and cube Rwtes of a Fraction or parts of a number, in as briefe a method, and as exactly as I can deliuer it. And first, to find the nearest cube Rwt of a number, not cubicke, the rwte in whole number being extracted set the remainer of the giuen number ouer a line for numerator, and for the denominator triple the Rwte found, which triple multiply againe by the rwte found and to the product therof, adding the former triple set the totall vnder the line for denominator, as for example, if you would extract the cube rwte of 24, the greatest cube cumber therein is 8 whose cube rwt is 2, and taking 8 from 24 rests 16, which I set ouer a line for numerator as you see, then the triple of 2 the Rwte found is 6, which multiplyed by 2 the said Rwte produceth 12, vnto which adding the former triple 6 the totall is 18, which I set for denominator, whereby I conclude by this rule that 2 and $\frac{16}{18}$ parts or $\frac{8}{9}$ is the nearest cube Rwte of 24; for tryall whereof if you multiply $2\frac{8}{9}$ cubickely the product therof will be $\frac{17576}{729}$ or 24 $\frac{80}{729}$ which is somwhat more then $\frac{1}{10}$ of an vnity more then the giuen number, which is

16 | $2\frac{16}{18}$
24
8

16 | $2\frac{16}{18}$
24
8

of

of a briefe way the truest that I know, but if you list to take some more paines about it, there is a more perfect way to get both the square and cube roots of numbers, not squares nor cubicke which is thus to your giuen number, for the square Roote adde 2. 4. or 6. Ciphers, or more as you desire the nerenes of the roote, and then working as is before taught for euery 2 Ciphers which were added to the giuen number you shal haue one figure in the quotient to bee taken from the Roote, which figures so ouerplus must be the numerator, and halfe the number of Ciphers so added to the giuen number, the denominator as if you adde 6 Ciphers your denominator shall bee 1000, if 4 Ciphers be added the denominator shall be 100, and if onely 2 Ciphers bee added the denominator is 10, and the ouerplus of the quotient, parts thereof, and for the cube Roote you must adde so many times 3 Ciphers, as you desire the nerenes of the Roote, and hauing extracted the cube Roote therefrom cut off for euery 3 Ciphers so added, one figure of the Roote towards the right hand, the said figures standing for numerator, and the $\frac{2}{3}$ of the ciphers added for denominator.

Inni. This seemeth to mee somewhat difficult, and therefore I pray you explaine it to mee by an example of each kind, and then I doubt not but to vnderstand your meaning.

Theod. Let 18 be a giuen number, of which I desire the nereſt square roote, which I set down with 6 Ciphers annexed thereunto putting pricks vnder each second figure as was before shewed, and working according to the former order I find the quotient to consist of 4 figures, viz. 4242,

and

and certaine figures remaining which being to little purpose I meddle not withall, onely I cut off the 3 last figures of the quotient and set them ouer a line for numerator, and vnder it for denominator, I set the figure 1 with halfe so many Ciphers which were added to the giuen number, and so haue I for the neareſt ſquare roote of 184, & $\frac{242}{110}$ or $\frac{121}{100}$, which is somewhat more then $4\frac{1}{5}$. Againe to extract the neareſt cube roote of a number not right cubicke, after the same manner left 66 to bee a giuen number, of which the neareſt roote is required: Firſt I ſet downe 66 and with it I adde 6 Ciphers in this order,

where I ſée that I muſt haue in 66000000 | ____
† wholequotiēt 3 figures, wher- † † † †
as only one figure ſerueth to 66 for the Cube Root, and working according to the former Rule, I find that my quotient will bee 404, from which because I added 2 times 3 Ciphers to the giuen number, I cut off the 2 laſt figures of the quotient, and ſetting the firſt for the Roote, and the other 2 ſo cut off for numerator, I find that I ſhall haue for my neareſt Cube Roote $4\frac{4}{100}$ or $4\frac{1}{25}$, for the neareſt Roote of 66.

Iunii. Sir, I doe now perceiue the manner thereof, and doubt not but by further practiſe to attaine to perfection therein, in which reſpect I will not trouble you any longer at this time about it, onely if as you promiſed you will ſhew me the manner how to extract the ſquare & Cube Roote of a Fraction, and then ſome little vſe of the Cube Roote, I will not onely bee attentiue, but alſo reſt thankfull for your paines.

Theod. Remembring what you haue already learned

ned, you will find no difficulty in the extracting the Roote of a Fraction, which is no more but this. First reduce your Fraction into his least Denomination, which done, take the Roote of the Numerator for the Numerator, and the Roote of the Denominator for the Denominator: As for your better ease, let $\frac{16}{49}$ be a fraction of which you would haue the square Roote, I see that 4 is the Roote of 16, therefore I set 4 for Numerator, and 7 is the Roote of 49, so I set 7 for denominator, and I haue $\frac{4}{7}$ for the square Roote of $\frac{16}{49}$.

Againe, let $\frac{8}{64}$ be a Fraction, of which I would haue the Cube Roote, the cube Roote of 8 is 2, which I set for numerator, and the Cube Roote of 64 is 4, which I set for Denominator, so haue I $\frac{2}{4}$ or $\frac{1}{2}$ for the Cube roote of $\frac{8}{64}$: this I doubt not but will suffice for the knowledge how to extract the square or Cube Roote of any number or part of a number whatsoeuer: and albeit that in your Mathematicall practises, you shall find manifold vses of extractions in both kinds, yet for your better satisfaction I will giue you a question, wherein the extraction of the Cube Roote is required, which is thus. There is Bullet whose diameter is knowne to bee 6 inches, and I would haue another Bullet which should containe iust the double in quantity to the sayd former Bullet of 6 inches diameter. The question is, what diameter the second Bullet ought to containe, that the whole body or crassitude must be double to the former?

Iuuy. Truely, I am now absolutely on ground, for albeit that I can extract the cube Roote, yet can I not imagine how to answere your question.

Theod. For your instruction in this and such like questions

queſtions as Tartaglia hath taught me, ſo will I ſhew you the like which is, you muſt cube the diameter knowne from the double, of which cube, the cube roote being extracted giue you the true diameter of the other bullet.

Iuni. This ſeemeth eaſie, and I doubt not but to anſwere your queſtion thus. Firſt the cube of 6 is 216, of which the double is 432, and the nereſt cube Roote contained in 432 I find to be 7, whoſe cube number being 343, I ſubſtract from 432, and the remainer is 89, which as you taught me I ſet for numerator, and for to find the denominator, I triple 7 the Roote found and that triple 21 multiplied by 7, the ſaid roote giues 147, vnto which adding the former triple 21, the total is 168, which I put for denominator, and ſo haue I 7 $\frac{89}{168}$ inches the nereſt Roote for the diameter of that bullet, which muſt be double to the former whoſe diameter was 6 inches.

Theod. You haue done well, and therefore now not doubting but that your owne practiſe will draw you on to perfection in theſe thinges, my buſines calleth me away, I will leaue you till a further opportunity, and at our next meeting (which by Gods grace ſhall bee very ſhortly) I will performe the reſt of my promiſe in teaching you in the plaineſt method that I can thinke of, Cubicke numbers.

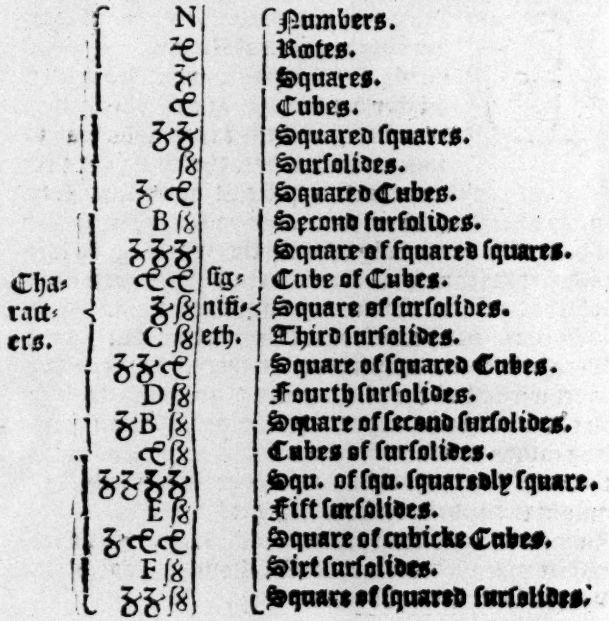
Iuni. Sir, I very hartely thanke you for your former paines, and the promiſe of your further kindnes, beſeeching God to bleſſe you to the end, and to further you in and to the finiſhing of all your good and laudable labours.

FINIS.

¶ A briefe introduction or entrance into the Art of Coſsicke Numbers, drawne out of M. *Valentine Menher* his Arithmeticke.

BEfore we enter into the maner of working by this kind of Arithmeticke commonly called by the name of the great & mighty art of Algebra, or Coſsick numbers, being a ſubtill & ingenious way of inuentiõ, for the ready finding out & reſolution of obſcure, hard, & difficult queſtions. It is méete & neceſſary to explaine vnto you, the ſignes and Characters commonly vſed in the working by this ſaid Art, with each of their ſeuerall ſignifications: which albeit that they may bee drawne out almoſt, ad infinitum, yet becauſe that this worke is but (as it were) a breuiate or introduction thereunto, as rather to giue a taſt of the pleaſantnes of working by this Art, thereby to induce & ſtir vp the ingenious and willing minds to a farther ſearch into ỳ ſecret myſteries thereof, then, to ſhew the whole tract thereof, which is only fit to bee done by ſome of great knowledge, ſound Iudgement, and long practiſe in the ſame. In which reſpect as I ſayd before, theſe following Characters will be ſufficient to be herein explained.

This line —— ioyned with any number ſignifieth leſſe, or ſo many as the number therewith impoꝛteth, to be abated therefrom, this ſhoꝛt line with a croſſe + ſignifieth moꝛe, oꝛ ſo many as the number oꝛ quantity ioyned therewith impoꝛteth to bee increaſed oꝛ added thereunto, this Character √ ſignifieth the ſource roote oꝛ beginning of any number oꝛ quantity whatſoeuer. Foꝛ the reſt of the Characters commonly vſed in this booke, let this following table inſtruct you.



Addition,

Addition.

When you are to adde numbers only, hauing no other denomination, you are to vſe ordinary addition, if you are to ad numbers with denominations whoſe ſignes are alike, ad only the numbers, & to the totall adioyne the common ſigne, but if you are to ad numbers with ſeuerall denominations or Characters, then muſt they be ſet downe with this ſigne + of augmentation, as for example, to ad 12 with 24 they make 36, to adde 12 ℨ with 24 ℨ makes 36 ℨ, but to adde 12 ℨ with 24 ℨ, they muſt be ſet in this order 24 ℨ + 12 ℨ: alſo if you are to ad ſeuerall numbers of diuers denominations & with contrary ſignes of +, or —, if the number with the ſigne + bee greater then the number with the ſigne —, take the one from the other & ſet downe the remainer with the ſigne +, but if the number of the ſigne — bee greater then the number of the ſigne +, take one from the other, & ſet downe the remainer with the ſigne —, theſe few examples will ſhew moſt of their varieties.

3 ℨ + 5	3 ℨ ℨ − 1 ℨ	15 ☌ + 7 ℨ + 10 ℨ
6 ℨ + 10	2 ℨ ℨ + 4 ℨ	13 ☌ — 3 ℨ — 5 ℨ
9 ℨ + 15	5 ℨ ℨ + 3 ℨ	12 ℨ + 2 ℨ + 4
7 ℨ + 3 ℨ	3 ☌ — 2 ℨ ℨ	28 ☌ + 16 ℨ + 7 ℨ + 4
4 ℨ − 6 ℨ	1 ☌ — 4 ℨ	
11 ℨ − 3 ℨ	4 ☌ — 6 ℨ	

Subſtraction.

IN Subſtraction you are to conſider the number, denominations, and ſignes.

Firſt, if the denominations and ſignes be alike, and the vpper number of each denomination greater then the loweſt, then ſet downe the remainer with the like ſigne + or —.

2. If the denominations be alike & ſignes +, and the lower number greater then the vppermoſt, take the leſſer from the greater, & withall ſet the ſigne —.

3. If the denominations be like the ſignes —, and the lower number greater then the vppermoſt, take the one from the other, and with the remainer ſet the ſigne +.

4. If the denominations bee like the ſignes +, and the loweſt number greateſt, take the one from the other, and with the remainer ſet the ſigne —.

5. If the denominations be like the vpper ſigne +, the loweſt — and the vpper number greateſt, adde the two numbers together, and withall ſet the ſigne +.

6. If the denomination be like the vpper ſigne —, the vpper number leaſt, and the lower ſigne + ad the two numbers together, & withal ſet the ſigne —.

Theſe example following will make all plaine.

8 ☉ + 6	5 ☉ — 6	8 ☌ + 6 ☉
6 ☉ + 4	2 ☉ — 2	3 ☌ + 8 ☉
2 ☉ + 2	3 ☉ — 4	5 ☌ — 2 ☉

6 ☉

6ze — 6	6zg — 6ze	6ze + 6
2ze — 8	2zg — 8ze	3ze — 3
4ze + 2	4zg + 2ze	3ze + 12
4ze — 3	8zg + 10ze	5ce — 4
2ze + 5	3zg — 5ze	2ce + 7
2ze — 8	5zg + 15ze	3ce — 11
5ze + 3 — 2zg	6zg + 4ce	6ze + 4
3ze + 1	2zg + 3ce — 10	2ze — 2 + 3zg
2ze + 2 — 2zg	4zg + 1ce + 10	4ze + 6 — 3zg

Multiplication.

FOr to multiply in this Rule, it is neceſſary firſt to ſet downe a Table of the ſeuerall quantities from the number ſimply, ſo farre as you thinke you ſhall haue occaſion, ſetting ouer the firſt a Cipher, ouer the next 1. ouer the next 2, &c. as this following Table ſheweth.

0.	1.	2.	3.	4.	5.	6.	7.	8.
N.	ze.	zg.	ce.	zzg.	ſs.	zzc.	B ſs.	zzzg.

9.	10.	11.	12.
cc.	zzs.	C ſs.	zzzc.

And when you are to multiply one quantity by an other, loke what number ſtandeth ouer either of their Characters, which ſaid two numbers adde together, and the Character vnder the totall ſo added, ſhall ſigni-

ſie the quantity belonging to the product of the ſayd multiplication, as if you multiply 3 ☉ by 4 ☽, the product will bee 12 ☌ beeing that ouer ☉ and ☽ is 1 and 2, which beeing together 3 vnder the ſame is the Character ☌ : Alſo if you multiply ☽ ☌ by ☌ ☌ ouer the one is 6, ouer the other 9, which added together makes 15, ſhewing that the product of the ſaid Multiplycation belongs to the 15 quantity whoſe Character is ☌ ſ8, for your ſignes of + or —, when you multiplylike by like, that is to ſay + by + or — by — the product is alwaies +, but if you multiply + by — or — by +, then muſt the ſigne of the product be —, againe when you multiply numbers of ſeuerall denominations, ſet the leaſt vndermoſt, and then multiply them one by the other, as theſe following examples will inſtruct you.

3 ☉ + 4
5 ☉ + 2
15 ☽ + 20 ☉
+ 6 ☉ + 8
15 ☽ + 26 ☉ + 8

2 ☉ + 1
3 ☽
6 ☌ + 3 ☽
3 ☽ — 1 ☉
1 ☉ — 4
3 ☌ — 1 ☽
— 12 ☽ + 4 ☉
3 ☌ — 13 ☽ + 4 ☉

4 ☉ + 5
3 ☉ — 2
12 ☽ + 15 ☉
— 8 ☉ — 10
12 ☽ + 7 ☉ — 10

When

When you would diuide one quantity by another of like denominations, the quotient is alwaies a number ſimple, and if you diuide a quantity by a ſimple number, the quantity retaineth his former ſigne, but when you are to diuide quantities of vnlike denominations, to know what ſigne to adioyne therwith, reſort to the former table in multiplication, and taking the number of the leſſer quantity from the greater, with your quotient ioyne the Caracter belonging to the number of the remainer, as if you diuide 6 ☉ by 2 ☿, the quotient will be 3 ☿, if you diuide 6 ☌ by 3 ☿ the quotient is 2 ☉, and when you are to diuide a leſſer quantity by a greater, put the diuiſor vnder the ſumme that is to bee diuided, and ſubſtract the leſſer quantity from the greateſt, the remainer ſheweth the quantity for the Denominator, and the Numerator ſhall be alwaies a number ſimple. As for Example, if you would diuide 6 ☿ by 2 ☌ the quotient will bee $\frac{3}{1}$, then if you ſubſtract the number ouer the ☿ from the number ouer the ☌, which is 1 from 3, the remayner being 2, ſheweth that the Caracter ♃ is to bee ioyned with the denominator, and ſo will the worke bee.

$$\frac{6\,☿}{2\,☌} \text{ or } \frac{3\,☿}{1\,☌} \text{ or } \frac{3}{1\,♃}$$

When there is a number to be diuided bëing without quantity, it is to be vnderſtood as a number ſimple or abſolute, and when a quantity ſtandeth in the midſt and ioyned with a fraction, it valueth as much as if it were ſet with a numerator, as $\frac{2\mathcal{C}}{3N}$ or $\frac{2}{3}\mathcal{C}$ $\frac{3\mathcal{Z}}{4N}$ or $\frac{3}{4}\mathcal{Z}$

where you are to vnderſtand that quantities may bë diuided by numbers, but when numbers are to be diuided by quantities, then are the quantities to bee ſet with the denominators, as if 4, N, were to be diuided by $5\mathcal{Z}$ or $3\mathcal{C}$, by $4\mathcal{Z}$, they will be in this order.

$$\frac{4N}{5\mathcal{Z}} \quad \frac{3\mathcal{C}}{4\mathcal{Z}} \quad \frac{3N}{4\mathcal{C}} \text{ or } \frac{3}{4\mathcal{C}}.$$

Moreouer, if you would diuide a Summe of many quantities by another of diuers quantities or denominations, then onely ſet the diuiſor vnder the diuidend, as for example if $3\mathcal{Z}+6$ were to be diuided by $2\mathcal{Z}+1$ or $2\mathcal{C}+3\mathcal{Z}$, by $4\mathcal{C}+2$ they will be,

$$\frac{3\mathcal{Z}+6}{2\mathcal{Z}+1} \text{ and } \frac{2\mathcal{C}+3\mathcal{Z}}{4\mathcal{C}+2}.$$

Addition in broken Numbers.

FOr to adde $\frac{1}{4}\mathcal{Z}$ with $\frac{1}{3}\mathcal{C}$, Multiply $3\mathcal{Z}$ by 2 numbers, and the product is $6\mathcal{Z}$: againe Multiply 4 numbers by $1\mathcal{C}$, the product is $4\mathcal{C}$, which added with $6\mathcal{Z}$ makes $6\mathcal{Z}+4\mathcal{C}$ for the new Numerator, then multiply

multiply 4 numbers by 2 numbers, and the product being 8 numbers, w̄ ſet vnder ỹ line for denominator: ſo will it be $\frac{6\,\mathcal{Z}+4\,\mathcal{Z}\mathcal{Z}}{8\text{ N.}}$ $\frac{02\frac{1}{4}\,\mathcal{Z}+\frac{1}{2}\,\mathcal{Z}\mathcal{Z}}{1}$ or $\frac{1}{4}\,\mathcal{Z}+\frac{1}{2}\,\mathcal{Z}\mathcal{Z}$

To adde $\frac{2\text{ N.}}{3\,\mathcal{Z}\mathcal{Z}}$ with $\frac{4\text{ N.}}{5\,\mathcal{Z}}$ the product is $\frac{10\,\mathcal{Z}+12\,\mathcal{Z}\mathcal{Z}}{15\,\mathcal{Z}\mathcal{Z}.}$

To adde $3.\mathcal{Z}\mathcal{Z}$ with $\frac{1}{3}\,\mathcal{Z}$, the product is $\frac{2\,\mathcal{Z}3+9\,\mathcal{Z}\mathcal{Z}}{3\text{ N.}}$

To ad $\frac{20\text{ N.}}{3\,\mathcal{Z}\mathcal{Z}}$ with $\frac{20}{1\,\mathcal{Z}\mathcal{Z}-4}$ it makes $\frac{80\,\mathcal{Z}\mathcal{Z}-80}{3\,\mathcal{Z}3-12\,\mathcal{Z}\mathcal{Z}}$

To ad $\frac{5}{2\,\mathcal{Z}\mathcal{Z}+5}$ with $\frac{3\,\mathcal{Z}3+4}{2\,\mathcal{Z}\mathcal{Z}+5}$ it makes $\frac{3\,\mathcal{Z}3+9}{2\,\mathcal{Z}\mathcal{Z}+5}$

Subſtraction.

TO Subſtract one broken number from another, is in no other maner then in Addition, for like as there you ad one number to another, ſo here you muſt firſt reduce them, and then take the one from the other, and ſet downe the remainer, as for example.

To ſubſtract $\frac{2\text{ N.}}{3\,\mathcal{Z}\mathcal{Z}}$ from $\frac{4\text{ N.}}{5\,\mathcal{Z}\mathcal{Z}}$ ỹ remainer is $\frac{2\,\mathcal{Z}\mathcal{Z}}{15\,\mathcal{Z}3}$ or $\frac{2\text{ N.}}{15\,\mathcal{Z}\mathcal{Z}}$

To ſubſtract $\frac{2\,\mathcal{Z}\mathcal{Z}-3}{4}$ from $\frac{4}{2\,\mathcal{Z}\mathcal{Z}+5}$ there reſts $\frac{25-4\,\mathcal{Z}3}{8\,\mathcal{Z}\mathcal{Z}+12}$

To

To ſubſtract $\frac{1\ N.}{2\ \mathcal{Z}}$ from $\frac{3\ \mathcal{C}}{4\ N.}$ there reſteth $\frac{6\mathcal{C}-4}{8\ \mathcal{Z}}$

To ſubſtract $\frac{8}{2\mathcal{C}-5}$ from $\frac{11}{2\mathcal{C}-5}$ there reſts $\frac{3}{2\mathcal{C}-5}$

Multiplication.

FOr to multiply one broken number by another, multiply the one numerator by the other, having good regard to the quantities that are to proceed therefrom, as is before ſhewed in multiplication Coſsick, which product ſhall be your new numerator: and likewiſe multiply the Denominators each by other, the product ſhall be the new denominator.

Example.

To multiply $\frac{1}{4}\mathcal{C}$ by $\frac{1}{2}\mathcal{C}$ the product is $\frac{1}{8}\mathcal{Z}$.

To multiply $\frac{1}{2}\mathcal{Z}$ by $\frac{1}{4}\mathcal{C}$ the product is $\frac{1\mathcal{C}}{8\ \mathcal{Z}.}$

To multiply $\frac{1}{4}\mathcal{C}$ by $\frac{1}{2}\mathcal{Z}$, the product is $\frac{1}{8}\mathcal{C}$.

To multiply $\frac{1}{3}\mathcal{C}$ by $1\mathcal{C}-5$ the product is $\frac{2\mathcal{Z}-10\mathcal{C}}{3}$

To

To multiply $\frac{3\mathcal{Z}+2}{4\mathcal{Z}-1\mathcal{C}}$ by $\frac{2\mathcal{Z}-4}{1\mathcal{Z}+3}$ the product is

$$6\mathcal{Z}-8\mathcal{C}-8$$
$$4\mathcal{Z}\mathcal{Z}-1\mathcal{C}+12\mathcal{Z}-3\mathcal{C}$$

Diuision.

In diuision haue regard only to the alteration of the signes or quantities, and then worke as in the former diuision, as if you would diuide $\frac{1}{2}\mathcal{C}$ by $\frac{1}{4}\mathcal{Z}$ multiply 4 by $2\mathcal{C}$ the product is $8\mathcal{C}$ for numerator, then 3 by $1\mathcal{Z}$ is $3\mathcal{Z}$ for denominator:

so is your worke $\frac{8\mathcal{C}}{3\mathcal{Z}}$ or $\frac{8N}{3\mathcal{C}}$ or $\frac{2\frac{2}{3}}{1\mathcal{C}}$

being by abbreuiation brought to the lowest termes. Heare should now consequently follow the said former rules, viz. Addition, Subtraction, Multiplication, & Diuision, as well in irrationall or surd numbers, as also in binoms and residuals, but being that they are chiefly needful for the explanation & resolution of more obscure and difficult questions then I purpose in this Treatise to meddle withall, I will passe them ouer, and now proceed to the 4. kinds of Equations, with exemplary questions vpon each of them.

Of the first kind of Equations.

When an absolute or simple number is equal to a $\mathcal{C}$, then must you diuide the absolute nũber by

by that number which hath the ☉ adioyned therwith, and thereby will be produced the value of a ☉, as if 3 ☉ are equall to 9, diuide 9 by 3, thereof commeth 3 for the value of a ☉. Also if 3 ☽ ☵ shall bee equall to 9 ☾, then 3 ☾ shall be equall to 9 ☽, and 3 ☵ equal to 9 ☉, 3 ☉ equall to 9, and 1 ☉ equall to 3.

When two quantities are equall the one to the other, betweene which one of their common order is ouerpast or left out, then must you diuide the lesser by the greater, and from the product extract the ✓☽. and that which commeth thereof shall bee the value of a ☉, as if 3 ☽ ☵ were equall to 27 ☽, then shall 3 ☾ bee equall to 27 ☉, and 3 ☽ to 27 numbers, then if you diuide 27 numbers by 3 ☽, the product is 9 numbers equall to 1 ☽, so that 9 being the ☵ the ✓ therof being 3, sheweth the value of a ☉.

When two quantities are equall the one to the other, and that two of their common order of quantities are left betwixt them, diuide the lesser by the greater, and from the product extract the ✓☾, which ✓ so extracted is the value of a ☉, as if 3 ♓ are equall to 81 ☽, 3 ☽ ☵ shall bee equall to 81 ☉, and the 3 ☾ to 81 numbers, then diuiding 81 by 3, the quotient is 27, whose ☾ ✓ being 3 is the value of one ☉.

Moreouer, when two quantities are equall the one to the other, betweene which 3 of their common order are left, diuide the lesser by the greater, and from the product extract the ✓☽ ☵, as if 3 ☽ ☾ are equall to 243 ☽ then is 3 ♓ equall to 243 ☉, and 3 ☽ ☵ to 243 numbers, then if you diuide 243 by 3, thereof commeth 81, whose ♓ ☽ ☵ being 3 sheweth the value of a ☉.

ze. And the like order to be obſerued for the difference of all quantities whatſoeuer in this firſt kind of Equations.

The ſecond kind of Equations.

When three quantities in common order are in ſuch manner that two greater are equall to a leſſer, then muſt you diuide the leſſer by the greater, and multiply the halfe of the meane quantitie in himſelfe, and to the product adde the leſſer quantitie, from which product extract the ✓, and from the ſayd ✓ take the halfe of the meane quantitie, the remainer whereof ſhall be the value of a ze. As for example, if 3 zz + 4 ce bee equall to 39 z then is 3 ce + 4 z equall to 39 ze, 3 z + 4 ze to 39 numbers, and 1 ⅓ + 1 ⅓ ze to 13, this done, multiply the halfe of 1 ⅓ in it ſelfe, which is the meane quantitie, and thereof commeth ⅘, which added with 13 maketh 13 ⅘, of which the ✓ is 3 ⅗, from which if you take ⅔ the halfe of the meane quantity, there will reſt 3 for the value of a ze.

The third kind.

When three quantities are in ſuch ſort in their common order, that a greater and a leſſer are equall to the meaner, then diuide the meane and leſſer by the greater, and then multiply the ½ of the meane quotient in himſelfe, and from the product take the quotient of the leſſer quantitie, and from the remainer extract the ✓, the product of which extractiõ either

adde

ad to or ſubſtract from the ½ of the meane quotient as occaſion of the worke ſhall require, which totall or remainer ſhall be the value of a ☉, as for example, if 3 ☉☉ + 216 ☉ be equall to 54 ☉, then 3 ☉ + 216 ☉ ſhall be equall to 54 ☉, and 3 ☉ + 216 numbers to 54 ☉, and 1 ☉ + 72 to 18 ☉, then if you multiply the ½ of 18 in it ſelfe, the product thereof is 81, from which taking 72 there will reſt 9, whoſe √ is 3, the ſame added with 9 the ½ of the roted number is 12, or otherwiſe if you ſubſtract 3 from the ſaid roted number 9, there reſts 6, and ſo haue you found 2 numbers, viz. 12 or 6 for the value of a ☉.

The fourth kind.

When 3 quantities are in their common order in ſuch ſort that the two leſſer are equall to the greater, then ſhall you diuide all 3 quantities by the greater, and then multiply the ½ of the meane quotient in it ſelfe, to the product whereof adde the quotient of the leſſer quantity, and the √ of that product adde with the ½ of the meane quotient, which number ſo produced is the value of 1 ☉. For example, if 3 ☉ ☉ are equall to 24 ☉ + 99 ☉, then ſhall 3 ☉ be equall to 24 ☉ + 99 ☉, 3 ☉ to 24 ☉ + 99 numbers, and 1 ☉ to 8 ☉ + 33, therefore if you multiply the ½ of the roted number in it ſelfe, the product thereof is 16, which added with 33 the number ſimple, the totall is 49, from which if you extract the √ ☉ which is 7 and adde therewith 4 the ½ of the roted number, you ſhall haue 11 for the value of one ☉.

For

For the working of ſeuerall kinds of Equations according to Stiffelius his Rule, the method thereof is thus, ſet alwaies the greateſt quantity apart by it ſelfe, and make your extraction from the others in ſuch ſort, as is demonſtrated by the quallity of the ſaid greateſt quantity, as if 1 ☉ were equall to 21 — 4 ☽, you muſt extract the ✓ of 21 — 4 ☽ in this manner, multiply the ½ of the roted number in it ſelfe, whoſe product will be 4, then muſt you regard wel whether your ſignes that you multiply by are more or leſſe; for if your ſignes be like, that is to ſay, + by + or — by —, then is your product alwaies +, but if they be vnlike as + by — or — by +, then is your product alwaies —, by which reaſon being that in this extraction you haue the ſigne —, the product of your multiplication is + 4, which if you ad with 21 your abſolute or ſimple number, the totall is 25 of which the ✓ ☉ is 5, from that becauſe the ſigne is —, take the ½ of the meane quantity or 4 ☽ which being 2 there will reſt 3, for the value of a ☽, but if the ſigne ioyned to the rote number had bẽn +, then ſhould you haue added the ½ of the meane quantity or roted number to 5 the ✓ ☉ extracted, and ſo ſhould you haue had 7 for the value of a ☽.

Againe, if you would extract the ✓ of 18 ☽ — 72 multiply the ½ of 18 in it ſelfe, and the product thereof will be 81, from which you muſt ſubſtract 72 becauſe the ſigne ioyned therewith is —— the remainer thereof is 9, of which the ✓ ☉ is 3, and for ſo much as the ſigne —— is loſt by the ſubſtraction, you may at your pleaſure either adde or ſubſtract the ſayd 3

to

to or from the ½ of the meane quantity, as you ſhall ſee fitteſt occaſion. Alſo when the equation is made in ſuch ſort that one figure of the common order is left out, as if 1 ☉☉ is equal to 18☉ — 72, then muſt you doe as is before ſhewed, and after extract the ✓ from the value of a ☾, and there will come the ✓ of 12, or the ✓ of 6 for the value of a ☾.

Moreouer, when two quantities betwéene other two are left out, you muſt then extract the ✓ ☾ from the laſt quotient, as if 1 ☉☉☉ + 3 ☉ are equall to 810☉, then ſhall 1 B☉ − 3 ☉☉ bee equall to 810☾. and 1 ☉☾ + 3 ☾ ſhall bee equall to 810, multiply therefore 1½ which is the halfe of the meane quantity in it ſelfe, and the product will be 2¼, which added vnto 810 makes 812¼, from the ſame extract the ✓☉, which is 28½, from that take 1½ the halfe of ỹ meane quantity, and againe from the remainer which is 27 extract the ✓ ☾, and thereof will come 3 for the value of one ☾.

Againe, when there is betwéene two quantities 3 of their common order left void, then muſt you at the end of your Equation, extract the ✓☉☉ as if 1 ☉☉☉ + 2 ☉☉ are equall to 6723, then ſhall you find by the former order of the worke, that 1 ☾ ſhall be equall to 2, and ſo of others.

For your further knowledge in reſolutions of theſe and ſuch like manner of Equations, take theſe few inſtructions following.

Let it bee propoſed that 4☉ + 12☾ + 10 are equall to 50, I deſire to know the value of 1☾, for the reſolution of this queſtion and ſuch like, obſerue this method; take from each abſolute or ſimple number,

ber 1, and then will there bee remaining 4 ☉ + 12 ☾ + 9 equall to 49: then againe, from each part extract the ✓ so shall you haue for 49. 7, and for 4 ☉ + 12 ☾ + 9, vse this order, first seeke the ✓ of 4 ☉ which is 2 ☾, that set apart by it selfe in stead of a quotient, then double the same, and seeke how often 4 ☾ the double thereof may bee found in 12 ☾, which is three times and there will rest nothing: then againe multiply 2 in it selfe whose product being 9 and taken from 9 the absolute number, there resteth nothing, so then will your quotient be 2 ☾ + 3 equall to 7 formerly found, or 2 ☾ equall to 4 which is also 1 ☾ equall to 2, or otherwise, if you take from each part 10, then there will rest 4 ☉ + 12 ☾ equall to 40, or 1 ☉ + 3 ☾ equall to 10, which is found by the second equation to be 1 ☾ equall to 2, but if you were to find the ✓ ☉ of 4 ☉ — 12 ☾ + 9, you must vse no other manner of worke then before, saue onely that instead of the signe + you must set downe the signe —.

Also in the same manner may you extract the ✓ ☾ or ✓ ☉ ☉, &c. from Cossicke Numbers in trinoms, as if 1 ☉ bee equall to 10 ☾ + 20 + ✓ 16 to find the value of a ☾, multiply the ½ of the number which belongeth to the ☾ in it selfe, whose product heere being 25 adde with 20 + ✓ 16, so shall you haue 45 + ✓ 16, from which extract the ✓ and there will come 7 which added with halfe the rooted number, and so shall you haue 12 for the value of a ☾.

Reduction of Equations.

That you may the better vnderſtand the manner how to reduce Equations, it is no more then to know when 2 things are equall the one to the other, and that if you adde to, or take from each part, like quantities, that ſtill their proportions are equall, as for example. If 3 Ri. — 6 ſ. be equall to 54 ſhillings, what is the value of one pound: for the reſolution of this and ſuch like queſtions, take this for a generall Rule, becauſe the ſigne is —, adde to each part 6 ſ. that is to ſay, if you adde 6 ſ. to 3 Ri. — 6 ſ. there will be 3 Ri. and if you ad 6 ſ. to 54 ſ. there wil be alſo 60 ſ equall to 3 Ri. by which reaſon 1 Ri. is equall to 20 ſ.

Likewiſe, when 2 things are equall the one to the other, and that you ſhall multiply the one by as much as you doe the other, the two products ſhall be alſo equall the one to the other, as if 2 Clothes coſt 12 Ri. if you multiply the 2 clothes and alſo the 12 Ri. each of them by 3, you ſhall haue 6 clothes equall to 36 ri. and if you multiply 2 by 36 the product will be as much as if you multiply 12 by 6, and if you diuide 36 by 12 the quotient will be as much as if you diuide 6 by 2.

Alſo, when any 2 numbers are equall one to another, their Squares, Cubes, or other quantities, ſhall likewiſe be equall the one to the other, as if 3 be equal to the √ of 9 if you multiply each by it ſelfe ſquarely, either of their ſaid ſquares will be 9.

If 3 ☉ + 5 bee equall to 14, ſubſtract from each part 5 and there will reſt 3 ☉ equall to 9, or 1 ☉ equall

equall to 3.

If 4 ☉ + 9 bee equall to 7 ☉ take 4 ☉ from 7 ☉, and there will reſt 3 ☉ equal to 9, or 1 ☉ equall to 3.

If 4 ☉ + 6 be equall to 3 ☉ + 12, take 6 from 12 and there will reſt 3 ☉ + 6 equall to 5 ☉, againe take 3 ☉ from 5 ☉, and there reſts 2 ☉ equall to 6 or 1 ☉ to 3.

If 3 ☉ — 6 be equall to 3, adde 6 with 3 and it will be 3 ☉ equall to 9, or 1 ☉ equall to 3.

If 4 ☉ + 6 be equall to 8 ☉ — 6, adde 6 and 6 together is 12, then take 4 ☉ from 8 ☉, and there reſts 4 ☉ equall to 12, or 1 ☉ equall to 3.

If 4 ☉ + 3 are equall to 5 ☉, take 4 ☉ from 5 ☉ reſts 1 ☉ equall to 3.

If 6 ☉ — 3 are equall to 27 — 4 ☉, adde 3 with 27 makes 30, then adde 4 ☉ to 6 ☉ is 10 ☉ equall to 30 or 1 ☉ equall to 3, and in the like ſort as theſe few kinds of Equations are reduced to the leaſt tearmes, and framed to the capacity of your underſtanding, the ſame methode is to be obſerued in other quantities of the like nature.

When it hapneth in Equations of 2 quantities that their ſignes are not alike, but that the one is + and the other —, then is the one to bee added with the other, as if 51 — 5 ☉ are equall to 4 ☽, if you adde the 4 ☽ with 5 ☉ there will be 4 ☽ + 5 ☉ equall to 51 which by the ſecond kind of Equation makes 1 ☉ equall to 3.

If 4 ☉ — 3 be equall to 3 ☉, adde 3 with 3 ☉ and it makes 3 ☉ + 3 equall to 4 ☉, and then taking 3 ☉ from 4 ☉, there reſts 1 ☉ equall to 3.

If 2 ☉ are equall to the √ of 12 ☉, multiply 2 ☉

in it ſelfe, and it will be 4 ☉ equall to 12 ☾, and ſo 1 ☾ equall to 3.

If 1 ☉ is equall to the ✓ ☾ of 81 ☉, multiple 1 ☉ in it ſelfe cubickely, and it will be 1 ☉ ☾ equall to 81 ☉, or 1 ☉ equall to 81 ☾, or 1 ☉ ☉ equall to 81, or 1 ☉ equall to 9, and 1 ☾ equall to 3.

If 3 ☾ — 3 are equall to the ✓ ☉ of 12 ☾, multiply 3 ☾ — 3 in it ſelfe and it will be 9 ☉ — 18 ☾ + 9 equall to 12 ☾, then if you adde 12 ☾ with 18 ☾, the product is 30 ☾ equall to 9 ☉ + 9: againe, if you diuide all the 3 numbers by 9 ☉ there will be 1 ☉ + 1 equall to 3 $\frac{1}{3}$ ☾, which by the 3 Equation makes 1 ☾ equall to 3.

If 1 ☾ + 1 be equall to the ✓ ☉ of 6 ☾ — 2 multiply 1 ☾ + 1 in it ſelfe, and the product is 1 ☉ + 2 ☾ + 1 equall to 6 ☾ — 2, then adde 2 with 1 makes 3, ſo ſhall you haue 1 ☉ + 2 ☾ + 3 equall to 6 ☾, then take 2 ☾ from 6 ☾ reſts 4 ☾ equall to 1 ☉ + 3, which by the third equation makes 1 ☾ equall to 3.

If $\frac{120}{2 ☾ + 6}$ are equall to $\frac{30}{1 ☾}$ Multiply croſſewiſe that is to ſay, 1 ☾ by 120, and the product is 120 ☾, then multiply 2 ☾ + 6 by 30, the product is 60 ☾ + 180 equall to 120 ☾, if then you take 60 ☾ from 120 ☾ there will reſt 60 ☾ equall to 180, or 1 ☾ equall to 3.

If $\frac{12 ☾ + 24}{3 ☾ + 3}$ be equall to $\frac{4 ☾ — 2}{2 ☾ + 4}$ Multiply 2 ☾ — 4 by 12 ☾ + 24 the product will be 24 ☉ — 96 then multiply 3 ☾ + 3 by 4 ☾ — 2, and the product will

will be 1 2 ☉ + 6 ☾ — 6 equall to 24 ☉ — 96, or 12 ☉ — 90 equall to 6 ☾, or 12 ☉ equall to 6 ☾ + 90, or 1 ☉ equall to ½ ☾ + 7½, or 1 ☾ equall to 3.

I doubt not but theſe former inſtructions with their following examples will be ſufficient for an entrance or paſſage into the further knowledge of this great and interminate Art of Algebra, or Coſsicke Numbers, and for thoſe that deſire more perfection in the ſame, I will onely referre them to the primary Authors, and ſuch as haue written more at large in the ſame Science, in the meane time for your better ſatisfaction I will ſet downe ſome examples of queſtions, with their ſolutions to bee wrought by each kind of equations heere formerly ſpoken of.

Examples vpon the firſt Equation.

1. Queſt. FInd out a number vnto the which if you ad the halfe of himſelfe and 6 more, the whole ſumme will be 60.

Anſw. For the reſolution of this queſtion and ſuch like, ſet downe by ſuppoſition that the number deſired to bee knowne is 1 ☾, the ½ whereof is ½ ☾ which with 6 more makes 1 ½ ☾ + 6 equall to 60, then for the working, if according to the former inſtructions you take from each part 6, there will reſt 1 ½ ☾ equall to 54, which 54 being diuided by 1 ½ you ſhall haue 36 for your number deſired.

2 Queſt. I would haue 10 diuided into two ſuch parts, that the $\frac{1}{2}$ of the one may bee as much as the $\frac{1}{4}$ of the other.

Anſw. I ſuppoſe that the leſſer of the two numbers is 1 ☉, then ſhall the other be 10 — 1 ☉, wherof the $\frac{1}{4}$ is $2\frac{1}{2} - \frac{1}{4}$ ☉ equall to $\frac{1}{2}$ ☉, which is the $\frac{1}{2}$ of the leſſer number, which by reduction makes $\frac{1}{4}$ ☉ equall to $2\frac{1}{2}$ or 1 ☉ equall to $3\frac{1}{3}$ for the leſſer part, and $6\frac{2}{3}$ for the greater part of the ſaid number.

3. Queſt. A Marchant had a Cloath of which he hath ſold 16 yards, and he hath ſtil remaining $\frac{7}{12}$ of the ſame cloath, the queſtion is, what the contents of the cloath was at the firſt.

Anſw. I ſay that the whole contents was 1 ☉ of yards, from which $\frac{7}{12}$ parts beeing taken leaueth $\frac{5}{12}$ ☉ equall to 16, or 1 ☉ equall to $38\frac{2}{5}$ for the whole Cloath.

4. Queſt. A Marchant buyeth 26 yards of cloath and Kerſie which together coſt 9 li. 16 ſ. or 196 ſ. the Cloath at 8 ſ. the yard, and the Kerſie at 7 ſ. the yard, the queſtion is, how many yards of each ſort hee had.

Anſw. I put for the yardes of Cloath 1 ☉, then muſt the Kerſie be 26 — 1 ☉, then I ſay by the rule of 3, if 1 yard be 8 ſ. what is 1 ☉ of yards, *facit* 8 ☉: againe I ſay, if 1 yard be 7 ſ. what is 26 — 1 ☉ *facit*. 182 — 7 ☉, thoſe added together makes 182 + 1 ☉ equall to 196 ſ. which reduced by order ſheweth that he had 14 yards of cloath, and 12 yards of Kerſie.

5. Queſt. A certaine yong Man going into a Garden, and meeting there with certaine Mayds, merrily ſaid

ſaid vnto them, God ſaue you all 10 faire Maides, to whome one of them made this anſwere, Sir you miſtake your ſelfe, for there are not 10 of vs, but if there were twiſe as many of vs as we now are, then ſhould we be as many more then 10, as we are now leſſe then 10. I demand the number of them.

Anſw. I make my ſuppoſition to be 1 ☉ of maids, vnto which adding 2 ☉ which is double the former ſuppoſition, the totall is 3 ☉, from which abating 10 becauſe your Sum is more by 10 then the true number your worke will be 3 ☉ —— 10 equall to 10 —— 1 ☉, which being reduced according to the firſt Equation, makes 1 ☉ equall to 5 maydens.

6. Queſt. A young man going into a Garden was to paſſe through three gates for to gather Apples, and at his comming backe againe hee met with a Mayde which requeſted ſome of his Apples to whome he gaue $\frac{1}{2}$ that he had, but ſhe gaue him 8 of them backe againe, at the ſecond gate he met another which likewiſe deſired ſome of his Apples, to whome he gaue $\frac{1}{3}$ of them he had left, and ſhe gaue him backe againe 1 Apple, ſolikewiſe at the third gate he gaue another the $\frac{1}{4}$ of them hee had yet left wanting but 4, and he had after all this remaining 12 Apples. I demand how many Apples in all he gathered.

Anſw. I propoſe that hee gathered 1 ☉ of Apples, of which he gaue away at the firſt gate $\frac{1}{2}$ ☉ — 8, then had hee ſtill $\frac{1}{2}$ ☉ + 8, of which at the ſecond gate hee gaue away $\frac{1}{4}$ — 1, ſo had hee then $\frac{1}{8}$ ☉ + 7, whereof at the third gate hee gaue away $\frac{1}{4}$ — 4, ſo hee had ſtill reſting $\frac{1}{16}$ ☉ + 7 $\frac{1}{2}$ equall to 12, or 1 ☉ equall to 24 Apples which he gathered.

7. Queſt. A Gold-ſmith hath 2 Cups of Siluer with one couer, all of them together waighing 12 ounces, and are in ſuch proportion that if the couer be put vpon the greateſt Cup, the waight is twiſe as much as the leſſer cup, and if the couer be put vpon the leſſer it wayeth iuſt as much as the greater, the queſtion is, what each of their waights are ſeuerally?

Anſw. Seeing that the greater Cup with the couer is twiſe as much as the leſſer in waight, it muſt follow neceſſarily that if the greater waight be 8 ounces, the leſſer is 4 ounces, then for the couer which is the leaſt of all, I put 1 ☜ & taking it from 8 there will reſt 8 — 1 ☜, againe adding 1 ☜ with 4 makes 1 ☜ + 4 equall to 8 — 1 ☜ which reduced makes 1 ☜ equall to 2 ounces for the waight of the couer, 6 ounces for the greateſt cup, and 4 ounces for the leſſer Cup.

8. Queſt. A man lying on his death-bed maketh his will in ſuch ſort, that his wife, his Sonne, and his daughter ſhall haue his goods ſo diuided amongſt them that the Mother ſhal haue ⅓ the Sonne ⅔ of the mother, and the Daughter the remainer, which remainer is 355 pound. The queſtion is, what the whole value of his goods did amount vnto, and what each part ſo diuided will come to.

Anſw. I put for the whole goods 1 ☜, of which the Mother taketh ⅓, and the ſon ⅔, of that ⅔ ☜ which reduced and added makes ⅔ ☜, which taken from 1 ☜ leaueth ⅓ ☜ equall to 355 li. or 1 ☜ equall to 2130 li. the whole goods, of which ⅓ for the Mothers part is 1065 li. and ⅔ of that for the Sons part is 710 pound, which with 355 li. the remainer for the Daughters part, being all added together maketh 2130 li. the totall Sum of all his goods formerly diuided.

9. Queſt.

9. Queſt. A Gentleman hyreth a Labourer to worke with him 40 daies, and conditioneth with him in this order, that for euery day that he workes he ſhall haue 8 d. a day, and for euery day that he playeth hee ſhall forfeit to his Maiſter 4 d. a day, at the end of 40 daies comming to reckon together, the Labourer was to receiue for his whole wages 10 s. 5 d. or 125 d. the queſtion is how many daies he wrought, and how many he played?

Anſw. Put 1 ☉ for the daies that he wrought, ſo ſhall you haue 40 — 1 ☉ for the daies that hee played, then ſay if 1 day get 8 d. what 1 ☉ of daies *facit*. 8 ☉ of d. againe if 1 day that he playes giues his Maſter 5 d. what 40 — 1 ☉ of daies *facit*. 200 — 5 ☉, which ſubſtracted from 8 ☉ leaueth 13 ☉ — 200 equall to 125, which reduced sheweth 25 daies that he wrought, and 15 that he played.

10. Queſt. A Man hireth a ſeruant and promiſeth him 19 s. and a Cloke, by the yeare, and after that he hath dwelt with him 5 moneths, falling at variance, the ſeruant goeth his way taking in ſatisfaction for his fiue moneths ſeruice, his Cloke and 5 s. in money, the queſtion is, what the Cloke was valued at?

Anſw. Say if 5 moneths gaine a Cloke and 5 ſhil what ſhall 12 moneths gaine, *facit*. 2 $\frac{2}{7}$ Clokes and 12 s. which are equall to 1 Cloke and 19 s. take then 12 s. from 19 s. and there will reſt 7 s. alſo take 1 Cloke from 2 $\frac{2}{7}$ and there reſts 1 $\frac{2}{7}$ equall to 7 s. or 1 Cloke equall to 5 s. the valued price of the Cloke.

11. Queſt. A Lyon, a Wolfe, and a Dog, are to eate a Sheepe, the Dogge ſayeth to the other two doubtleſſe I could well eat him vp in one howre, ſaith the Wolfe I could ſurely eate him vppe in the $\frac{1}{3}$ of an howre,

houre, then ſaith the Lyon, queſtionleſſe I could eate him vp in $\frac{1}{4}$ of an houre, well to conclude they agrée amongſt themſelues that the Lyon ſhall begin to eate $\frac{1}{5}$ of an houre before the other 2, and then they to eate all together. The queſtion is, in what time the whole Sheepe will be deuoured by them.

Anſw. Say firſt by the Rule of three, if in $\frac{1}{4}$ of an houre the Lyon eates the whole Sheepe, how much will he haue eaue eaten in $\frac{1}{5}$ of an houre, that he begins before the reſt, *facit.* $\frac{4}{5}$, then for the other halfe that is to be eaten by all together, I ſay they ſhall eate the reſt in 1 ℔ of houres, for the value of which rwte I ſay.

If $\frac{1}{4}$ giue $\frac{1}{1}$ what 1 ℔ *facit.* 4 ℔.

If $\frac{1}{5}$ giue $\frac{1}{1}$ what 1 ℔ *facit.* 2 ℔.

If 1 giue 1 what 1 ℔ *facit.* 1 ℔.

Which béeing all added together makes 7 ℔ equall to $\frac{1}{5}$ of an houre, or 1 ℔ equall to $\frac{1}{35}$ of an houre, vnto which $\frac{1}{5}$ of an houre that the Lyon began before the reſt, béeing added makes $\frac{11}{35}$ of an houre that they were eating in all.

12. Queſt. Two Ships departing from a certaine Port in England, each towards a ſeuerall place, the one ſayleth euery houre 2 leagues, and the other each houre 3 leagues, at the end of one houre they are departed the one from the other, each kéeping his courſe and way three leagues. The queſtion is how many leagues they ſhall be aſunder, when they haue ſayled 5 houres in the ſame proportion.

Anſw. If one houre giue 3 leagues of diſtance, what giues 5 houres, *facit.* 15 Leagues for their diſtance that they are aſunder.

13. Queſt. A Marchant buyeth Paper at 5 ſ. 6 d.

the

the Reame ready money, and ſelleth it againe for 6 ſ. the $\frac{1}{2}$ at 2 moneths, the queſtion is, what time he ſhall giue for the other halfe to gaine after 16 pound the hundred in a yeare.

Anſw. Put 1 ☉ of moneths for the other halfe and multiply each payment by his time, that is to ſay, $\frac{1}{2}$ by 2 and $\frac{1}{2}$ with 1 ☉, and the 2 products together will be $\frac{1}{2}$ ☉ + 1 Moneth, then ſubſtract the one price from the other, that is to ſay 5 $\frac{1}{2}$ from 6, there reſts $\frac{1}{2}$ then ſay if 5 $\frac{1}{2}$ gaine $\frac{1}{2}$, what gaines 100, *facit.* 9 $\frac{1}{11}$, againe, ſay if $\frac{1}{2}$ ☉ + 1, againe 9 $\frac{1}{11}$.

what gaines 12 moneths *facit.* $\frac{109\ \frac{1}{11}}{\frac{1}{2}\text{☉} + 1}$ equall to 16

and 1 ☉ equall to 11 $\frac{7}{11}$ of a moneth for the ſecond paiment.

14. Queſt. A Marchant oweth 300 li. to bee paid at 4 moneths, and at the end of one moneth hee commeth to his Creditor with 120 li. of his Money and ſaith thus vnto him, take this now and let mee haue the other 180 pound ſo much the longer, as will counteruaile the payment of this ſo long before the day: The queſtion is, what time he ſhall haue for the payment of the reſt.

Anſw. Multiply 300 by 4 moneths, the product is 1200, againe multiply 300 by 1 month, the product is 300, then for the reſt which is 180, put downe 1 ☉ of time, that multiplied together makes 180 ☉, vnto which adde 300 and it is 180 ☉ + 300 equall to 1200 or 1 ☉, equall to 5 moneths for the time that he ſhall haue to pay the reſt after he hath paid the firſt 120 li.

15. Queſt.

15. Queſt. A Marchant oweth 600 li. to bee payd in 3 ½ moneths, and at the end of 1 moneth hee payeth 100 li. of it, alſo at 2 moneths after hee payeth 200 li. more, the queſtion is in what time hee ought to pay the reſt of the money to bee in ſuch proportion as if it had bẽn paid altogether at the time firſt preſixed.

Anſw. If he vſe the 600 li. 1 Moneth and then repayeth 100 li. there reſts ſtill with him 500 li. that hee vſeth 2 moneths and then he payeth 200 li. more of it, ſo ſtill there remaines in his hand 300 li. and to know how long hee ſhall vſe it, to make the firſt proportion of time and money equall with theſe ſeuerall paiments remaines, and times, ſay, that hee ſhall vſe the ſaid 300 li. 1 ☌ of Moneths, then for the particular ſolution multiply each ſeuerall part of money by his time that he kept it, that is to ſay 600 by 1, 500 by 2, and laſtly 300 by 1 ☌, ſo will your ſeuerall Sums, times, and products bee as is here ſet downe each vnder other in the Margent, which all beeing added together makes that totall beeing diuided by 600 the firſt principall Summe makes

600	1	600
500	2	1000
300	1☌	300☌
300☌ + 1600		
300☌ + 1600		
600		

equall to 3 ½ moneths or 1 ☌ equall to 1 ½ of a moneth which is the time that the other 300 li. muſt be paid after the laſt 200 li. was paid.

16. Queſt. A Marchant oweth 300 li. to be paid in 4 moneths, the queſtion is how much hee ſhall pay at the end of one moneth, ſo that the reſt may ſtay 5 moneths before it be payd.

Anſw.

Anſw. Multiply 300 li. by 4 Moneths, the product is 1200, againe multiply 300 by 1 Moneth the product is 300, and for the money which is to be paid at 5 moneths, I ſet downe 1 ☉ which ſubſtracted from 300, leaues 300 — 1 ☉, that multiply by 5 moneths and the product is 1500 — 5 ☉, vnto which if you ad 300 the former product of 300 by 1 month, the total is 1800 — 5 ☉ equall to 1200, or 1 ☉ equall to 120 li. which is to be paid at 1 moneth.

17. Queſt. A Marchant hauing a friend whome hee loueth very well, lendeth him 450 li. gratis for 3 moneths, after which his friend willing to requite his kindnes in the like proportion, deſireth to know how much he ſhall lend him againe for 6 moneths.

Anſw. Multiply 450 by 3 the product is 1350 for the firſt mans money and time, then for the others money I put 1 ☉, which multiplyed by 6 Moneths, makes 6 ☉ equall to 1350, or 1 ☉ equall to 225 li. for to bee lent 6 Moneths in requitall of his friends kindnes.

81. Queſt. One putteth out 100 Pound to intereſt at 10 pound the Hundred for a yeare, and at euery 4 moneths he will haue $\frac{1}{3}$ both of principall and intereſt, and that one payment may bee as much as the other, the queſtion is, what each payment ſhall bee counting each 4 moneths, intereſt vpon intereſt?

Anſw. Say if 12 moneths gaine 10 pound, what 4 Moneths *facit*. $3\frac{1}{3}$ li. that diuide by 3 commeth $1\frac{1}{9}$

of

of a pound which is gained with 33 $\frac{1}{3}$ the third part of 100 li. againe ſay, if 4 moneths gaine 1 $\frac{1}{9}$ li. what gaineth 8 moneths *facit.* 2 $\frac{2}{9}$ li. which 33 $\frac{1}{3}$ li. gaineth in 8 moneths, more ſay if 4 moneths gaine 1 $\frac{1}{9}$ pound. what 12 moneths *facit.* 3 $\frac{1}{3}$ li. that adde with the other two former products, viz. 1 $\frac{1}{9}$ and 2 $\frac{2}{9}$ the totall is 6 $\frac{2}{3}$, which added to 100 li. makes 106 $\frac{2}{3}$ li. which is the whole ſumme that hee is to receiue both for principall and gaine: then for each ſeuerall payment take the $\frac{1}{3}$ of 106 $\frac{2}{3}$ which is 35 $\frac{5}{9}$, and for the principall of the firſt payment put downe 1 ☉, ſo ſhall the gaine of the firſt be 35 $\frac{5}{9}$ — 1 ☉, in ſaying if 100 li. giue 1 $\frac{1}{9}$ what 1 ☉ *facit.* $\frac{10}{900}$ ☉ equall to 35 $\frac{5}{9}$ — 1 ☉, or 35 $\frac{5}{1\,9}$ li. for the principall of the firſt 4 moneths, that being ſubſtracted from 35 $\frac{5}{9}$ leaues $\frac{1\,2\,0}{1\,1\,9}$ li. for the gaine of the firſt payment: Againe, ſet downe for the principall of the ſecond paiment 1 ☉, ſo ſhall the intereſt be 35 $\frac{5}{9}$ — 1 ☉, ſay then if 100 gaine 2 $\frac{2}{9}$, what 1 ☉ *facit* $\frac{2\,0}{9\,0\,0}$ ☉ equall to 35 $\frac{5}{9}$ — 1 ☉, or 34 $\frac{1\,8}{2\,1}$ for principall and $\frac{1\,6\,8}{1\,0\,7}$ li. for the intereſt of the ſecond paiment: Againe, for the principall of the third paiment, ſet downe 1 ☉, then ſhall the gaine bee 35 $\frac{5}{9}$ — 1 ☉, ſay then, if 100 giue 3 $\frac{1}{3}$, what 1 ☉ *facit.* $\frac{1}{3\,0}$ ☉ equall to 35 $\frac{5}{9}$ — 1 ☉, or 1 ☉ equall to 34 $\frac{1\,8}{9\,1}$ for the principall, and 1 $\frac{4\,1}{2\,7\,9}$ li. for the intereſt of the third and laſt payment.

19. Queſt. A Marchant putteth out 450 li. at intereſt, and at the end of two yeares hee receiueth for gaine and principall 648 li. The queſtion is, what the gaine of 100 li. the firſt yeare (counting intereſt vpon intereſt) commeth to.

Anſw. To reſolue this queſtion multiply 450 by 648, the product thereof is 291600, of which if you

extract

extract the ✓ there will come 540 for the principall and gaine of the firſt yeare, from which if you ſubſtract 450 the firſt principall, there will reſt 90 li. which is gained with 450, then for the gaines of 100 li. ſay, if 450 gaine 90, what 100 *facit* 20 li. the Hundred for the firſt yeare.

20. Queſt. If 100 li. being put out at intereſt upon intereſt, and that in 3 yeares the principal gaines comes to 200 li. I deſire to know the gaines of the firſt yeare.

Anſw. To worke this queſtion, multiply the firſt principall by the whole principall and gaine, viz. 100 by 200, the product thereof is 20000, which multiply againe by 100 and from the totall product which is 2000000, extract the ✓ ℂ which is 125 li. 19 ſhillings 10 pence neareſt, from wich if you ſubſtract 100 li. there will reſt 25 li. 19 ſ. 10 d. for the gaines of the firſt yeare.

The Rule of Company.

21. Queſt. TWo Marchants accompany together, A putting in 200 li. ſtocke for 5 moneths, and B 300 li. for 6 moneths, they haue gained together 100 li. the queſtion is, how much each of them are to haue of the gaine.

Anſw. Say. 5 200 1000
6 300 1800
1000 1 ℂ 1800 100 — 1 ℂ

facit. 1800 ℂ equall to 10000 — 1000 ℂ, or 1 ℂ equall to 35 $\frac{5}{7}$ for A, and 64 $\frac{3}{7}$ for B.

22 Queſt. Two Marchants haue their ſtockes in company, A put in 200 pounds for 5 moneths, and B put in 300 pounds, the queſtion is how long the ſtock of B muſt remaine in bancke to gaine together 100 pounds being that A takes $35\frac{1}{7}$ pounds.

Anſw.

5	200	1000	
1 ℔	300	300 ℔	
1000	$35\frac{1}{7}$	300 ℔	$64\frac{2}{7}$

facit 1 ℔ equall to 6 moneths.

23. Queſt. Two Marchants are in company, the one putteth in 200 pounds for 5 moneths, and he gayneth $35\frac{1}{7}$ pounds, how much money ought the other to put in for 6 moneths to gaine $64\frac{2}{7}$ pounds.

Anſw.

5	200	1000	
6	1 ℔	6 ℔	
1000	$35\frac{5}{6}$	6 ℔	$64\frac{2}{7}$

facit. 1 ℔ equall to 300 pounds.

24. Queſt. Two Marchants being in company, A putteth in 400 pound. and at the end of 5 Moneths he putteth in 200 pound more, and it reſteth in banke 7 moneths. B putteth in 700 pounds. and at the end of 3 moneths he taketh out 300 Pounds, and letteth the reſt remaine in bancke 9 moneths: they haue gayned together 238 Pounds, the queſtion is, what each of them ſhall haue of the ſaid gaine?

Anſw. For the reſolution of this queſtion, behold the manner of the worke therof, as followeth.

A 400

5	400	200
	200	4200
7	600	6200
3	700	2100
	300	
9	400	3600
		5700

6200 1℔ 5700 238 — 1 ℔
facit. 124 li. for A, and 114 for B.

25. Queſt. Two Marchants company together, A putteth in 400 li. and after a certaine time he addeth 200 li. more to it, and ſo it reſteth to the yeares end, B putteth in 700 li. and at 3 moneths hee taketh out 200 li. and leaueth the reſt till the end of the yeare, viz. 9 moneths, and at the yeares end they find that they haue gained together 238 pounds, of which A taketh 10 li. more then B, the queſtion is how long after the firſt 400 li. that A putteth in the other 200 li.

Anſw. Take the halfe of 238 pound which is 119 and alſo the $\frac{1}{2}$ of 10 li. which A taketh more then B which is 5, that ſubſtract from the greater number and adde it to the leſſer number, ſo ſhall you haue 124 pound for A, and 114 pound for B, then for the time deſired behold the manner of the worke as followeth.

1 ☜	400		400 ☜		
	200				
	600				
12—1 ☜	600		7200 —— 600 ☜		
			7200 —— 200 ☜		
3	700		2100		
	300				
9	400		3600		
7200—200 ☜	124		5700	114	

facit 1 ☜ equall to 5 moneths that A put in his 200 pounds after the other 400 pounds.

26. Queſt. Two Marchants trading together, A putteth in 110 li. and B putteth in 120 li. with which money they buy 50 Clothes, 20 at 4 li. the Cloth, and 30 at 5 li. the cloath, each of them taking 25 Cloathes for his ſhare of the money, the queſtion is how many of each price of cloth each of them ſhould take.

Anſw. Suppoſe that A taketh 1 ☜ of cloathes of 4 li. which muſt coſt him 4 ☜ then muſt hee haue of 5 pounds the Cloath 25 —— 1 ☜ which muſt coſt him 125 Pounds —— 5 ☜ equall to 110, or 1 ☜ equall to 15 Cloathes at 4 pound the peece, then muſt there bee alſo 10 cloaths of 5 pound a peece, amounting in value to 50 pounds, which with the other 15 cloathes of 4 pounds a peece comes to 110 pound, then will there remaine for B 5 cloaths of 4 pounds the peece, and 20 of 5 pounds the peece.

27 Queſt. Three Marchants haue made a Company, A put in 666 $\frac{2}{3}$ pounds, B put in 633 $\frac{1}{3}$ pounds, the

the queſtion is how much C put in béing that their whole gaines came to 300 pound after 15 in the hundred.

Anſw. $666\frac{2}{3}$
$633\frac{1}{3}$
$+1\,\mathcal{R}$
$1300+1\,\mathcal{R}$

Then ſay, if 100 giue 15, what $1300+1\,\mathcal{R}$ *facit*. $\frac{19500+15\,\mathcal{R}}{100}$ equall to 300 or $1\,\mathcal{R}$ equall to 700 li. for the money that C put in.

28. Queſt. Three Marchants make a Company, A and B together put in 1300 pounds, wherewith A gaineth 5 pounds more than B, the ſtocke that C put in was 700 pounds for himſelfe, and hee taketh 5 li. more of the gaines then A, the gaines of all their ſtockes together amounting to 300 pounds, the queſtion is how much mony every one put in, and what each mans part of the gaines comes to ſeuerally.

Anſw. Set downe the parts to worke by, as followeth.

A $1\,\mathcal{R}$
B $1\,\mathcal{R}-5$
C $1\,\mathcal{R}+5$

So is all their parts $3\,\mathcal{R}$, then ſay by the Rule of 3, if $3\,\mathcal{R}$ gaine 300 li. what $1\,\mathcal{R}$ *facit*. 100 li. for A, 95 li. for B, and 105 li. for C, and for each ſeuerall mans

ſtocke you ſhall haue for A 666 ⅔ li. for B 633 ⅓ li. and for C 700 li.

29. Queſt. There is 2880 li. to be diuided among 3 men, in ſuch ſort that for euery 3 li. that the firſt man takes, the ſecond ſhall take 4, and the third 5, the queſtion is what part euery one ſhal haue for his ſhare of the ſayd Summe.

1	3	1 ☉
2	4	1 ⅓ ☉
3	5	2 ⅔ ☉

facit. 4 ☉ equall to the whole Sum which is 2880 li. ſo is 1 ☉ equall to 720 li. for the firſt, 960 pound for the ſecond, and 1200 li. for the third.

30. Queſt. There is a Sum of money to bee diuided amongſt 3 men, of which ỹ firſt man taketh ¾ part wanting 1, the ſecond taketh ⅚ part and 4 more, and the third man taketh the remainer which is 10 more then the firſt mans part, the queſtion is what euery mans ſhare comes to, and what the whole Sum is.

Anſw. Firſt, for the whole Sum ſet downe 1 ☉, of which the firſt taketh ¾ ☉ — 1, the ſecond ⅚ ☉ + 4 which two products addded together and taken from 1 ☉ — 1 there reſts $\frac{7}{12}$ ☉ — 3 for the third man, which becauſe it muſt be more by 10 then the firſt mans part which is ¾ ☉ — 1 vnto which 10 being added makes ¾ ☉ + 9 equall to $\frac{7}{12}$ ☉ — 3, or 1 ☉ equall to 36 for the whole Sum, of which the ¾ — 1 for the firſt man is 8, the ⅚ + 4 for the ſecond is 10, which both taken from 36, leaues 18 for the third mans part, which is 10 more then the firſt mans.

31. Queſt.

31. Queſt. Two Marchants Barter their Marchandizes the one with the other, the one hath 10 clothes at 5 pound the péce ready money, the which in barter hee will not ſell vnder 6 pound, the other hath Sugar at 12 ß. a pound ready money, the firſt man will pay 40 li. ready money in hand, the queſtion is what the ſecond man muſt ſet his Sugar at in barter, and alſo how much hee muſt pay to the firſt man, that their Barter may be equall the one to the other.

10	10
6	5
60	50
40	40
100	90

Then ſay, if 1 ℔ giue 12, what 100 *facit*. 1200 equall to 90, or 1 ℔ equall to 13 $\frac{1}{3}$. 1 ℔

32. Queſt. A Vintner hath a veſſell of Wine containing 360 Quarts, out of which hee drawеth a certaine number of quarts and filleth it vp againe with water, againe hee drawеth out as many as hee did at the firſt, and filleth it againe with water, and thus he doth 3 times, and in the end hée findeth that there is ſtill 208 $\frac{1}{3}$ quarts of Wine beſides the water that was put into it, the queſtion is how many quarts hee drew out at each time.

Anſw. For to anſwere this queſtion you muſt conſider that you muſt haue 4 numbers in a continuall proportion, that is to ſay, two meane proportionalls betweene the two extreames, viz. 360 and 208 $\frac{1}{5}$, which muſt be in ſuch ſort, that if you multiply the 2 meane proportions together, they may bee as much as if you multipiy the two extreames together which is 75000, then for the ſecond number ſet downe 1 ℛ, and ſay by the Rule of 3, if 360 giue 1 ℛ, what giues 1 ℛ *facit* $\frac{1 ℛ}{360}$ for the third number, that multiply by 1 ℛ ſo ſhall you haue $\frac{1 ℭ}{360}$ equall to 75000, or 27000000 equall to 1 ℭ, and 1 ℛ equall to 300 for the ſecond number, that taken from 360 leaues 60 quarts that was drawne at each time.

33. Queſt. There is a veſſell of Wine of 8 pence the quart, out of which veſſell there is 60 quarts drawne, and the veſſell fil'd vp againe with Water, after that they draw out 60 quarts more and fil it vp with water, which is done alſo the third and fourth time, and in concluſion they find that the liquor then in the veſſell is in value at 3 $\frac{13}{16}\frac{9}{2}$ d. the queſtiõ is how many quarts the whole veſſell containeth.

Anſw. To anſwere this queſtion, put both the extreames of the prices in the leaſt proportionall parts of whole numbers, and ſo ſhall you haue for 8 pence the greateſt price 1296, and for 3 $\frac{13}{16}\frac{9}{2}$ d. you ſhall haue 625, which multiplyed the one by the other produceth 810000, of which the $\sqrt{ℨ}$ beeing extracted bringeth for 900 for the meane proportion, then ſeeke alſo another

other meane proportion betweene 1296 and 900, by multiplying the ſaid two numbers each by other, and extracting the ✓ ℨ as before, and ſo ſhall you haue 1080, which taken from 1296 leaues 216, alſo ſubſtract 900 from 1080 and there will remaine 180, then ſay by the Rule of 3, if 216 giue 60 the number of quarts drawen out at each time, what giues 180 *facit* 50 quarts of wine which is cõtained in 60 quarts when it hath bẽn twiſe drawen out, which being taken from 60 leaueth 10, then ſay againe if 10 giue 60, what giues 60, *facit* 360 quarts for the contents of the whole veſſell.

34. Queſt. There are two veſſels of a like faſhion but of vnlike bigneſſe, the one being a foote and ½ long, and the other but a foote long, the biggeſt containeth 4 gallonds, and the leſſer beeing euery way proportionall to the greater, I deſire to know the contents thereof.

Anſw. Conſider that 1 to 1 ½ is in proportion as 2 to 3, therefore multiply each in it ſelfe cubickely, ſo ſhall you haue 8 and 27 for the cubes of either of them, then ſay by the Rule of 3, if 27 the cube of the greater veſſell giue 4 Gallonds, what ſhall 8 the Cube of the leſſer giue *facit* 1 $\frac{1}{27}$ Gallonds for the contents of the leſſer veſſell.

35. Queſt. There are two cubique bodies the one of them 3 foote euery way whoſe waight is 400 li. and the other is 2 foote euery way, the queſtion is what the waight of the ſaid leſſer Cube is.

Anſw. Multiply each ſide into it ſelfe Cubiquely, that is to ſay, 3 times 3. 3 times is 27 for the greateſt Cube, and 2 tunes 2 twiſe is 8 for the leſſer, then ſay

by the Rule of 3, If 27 giue 400 what giues 8 *facit.* 118 $\frac{14}{27}$ pound for the waight of the leſſer Cube.

36. Queſt. There are 2 veſſells both of a like length, the one containing 600 quarts, and the other 400 quarts, of both which veſſels there is one made as bigge as conueniently may bée. The queſtion is, what the ſame veſſell ſo made of the other two may containe.

Anſw. Multiply 600 by 14 the product thereof will be 8400, that diuided by 11 the quotient is 763 $\frac{7}{11}$, from which extract the ✓ϡ which will be neareſt 27 $\frac{1}{7}$ for the diameter of the greateſt veſſell. Againe multiply 400 by 14, the product thereof is 5600, that diuide by 11 the quotient is 509 $\frac{1}{11}$, of which the ✓ϡ neareſt is 22 $\frac{1}{2}$ for the diameter of the leſſer veſſell, which added with 27 $\frac{1}{7}$ the greater diameter makes 50 $\frac{1}{10}$, multiply that ſquarely in it ſelfe and the product is 2510 $\frac{1}{100}$, then ſay by the Rule of 3, if 763 $\frac{7}{11}$ the quotient of the firſt worke, for the greateſt veſſell giue 600 quarts for the contents thereof, what ſhall 2510 $\frac{1}{100}$ (the ſquare of both their diameters added together) giue *facit* 1972 quarts, that the new veſſell made of the 2 former ſhall containe.

37. Queſt. A certaine Gentleman beeing a hunting and ſtarting of a Hare, hée found by the tract of her in the Snow, that the Hare had aduantage of the Dogge in béeing 50 paces before him, he found alſo by the ſnow and the ſeuerall ſtrides or diſtance of their féete in running, that for euery 7 ſtrides ỹ Hare made the Dogge made by 5, and euery 6 ſtrides or Paces of the Dogge were as much as 9 of the Hare, the queſtion

queſtion is in how many ſtrides running, the Dogge ſhall ouertake the Hare. The worke is thus.

5	7	6	*facit.* $8\frac{2}{5}$
	9	6	$\frac{3}{5}$ *facit* $\frac{2}{5}$
$\frac{2}{5}$	6	50	1 ☉

facit. 1 ☉ equall to 750 ſtrides that the dog ſhall make before he ouertake the Hare.

38. Queſt. A Gentleman agréeth with a Grasier to paſture him 100 ſhéepe for a yeare at a certaine price, at 2 moneths end hee deliuereth him 50 more to kéepe, and 3 Moneths after that hee deliuereth him other 50 saying vnto him, now would I haue you to kéepe theſe 200 ſhéepe onely ſo long as will counteruaile the price that I was to giue for the firſt 100 for a yeare, the queſtion is how long hée muſt kéepe the ſaid 200 ſhéepe, taking them in ſuch order as is before ſpecified.

Anſw. Put downe for the firſt 100 ſhéepe 1 ☉ of moneths, and for the nert 50 1 ☉ — 2 moneths, and for the laſt 50 which hée taketh 3 moneths after the other 50, ſet downe 1 ☉ — 5 moneths, then multiply 100 by 1 ☉, 50 by 1 ☉ — 2 moneths, and the other 50 by 1 ☉ — 5 mothes, and adding the 3 products together the whole is 200 ☉ — 350, againe multiply 100 ſhéepe by 12 moneths.

the

the time hée ſhould haue kept, the firſt 100 ſhéepe ſo haue you 1200 equall to 200 ☉ — 350 which is 1 ☉ equall to 7 ¼ monethes, that hée muſt kéepe the firſt 100 ſhéepe, the next 50 hée muſt kéepe 5 ¾ moneths, and the laſt 50 he muſt kéepe 2 ¼ moneths.

39. Queſt. Two Companions béeing at play at dice together, the one of them loſeth 170 Crownes at 4 chances, each chance béeing in quadruple proportion to other, the queſtion is, how many Crownes hée loſt at the firſt chance.

Anſw. Put for the firſt chance 1 ☉, then ſhall the ſecond chance be 4 ☉, the third 16 ☉, and the fourth 64 ☉, which all added together makes 85 ☉ equall to 170, or 1 ☉ equall to 2 Crownes for the firſt chance, 8 for the ſecond, 32 for the third, and 128 for the fourth.

40. Queſt. A Marchant is to receiue 80 pound in a triple proportion, and the laſt payment thereof falleth out to be 54 li. The queſtion is how much was paid at each time, and at how many tearmes it was payd.

Anſw. Put for the firſt time 1 ☉, then multiply 54 by 3 the exceſſe, the product is 162, from which take the firſt payment which is 1 ☉, then there will reſt 162 — 1 ☉, which diuided by 2 a number leſſe by 1 then the exceſſe, the quotient is 81 — ½ ☉ equall to 80, or 1 ☉ equall to 2, for the firſt tearme, 6 for the ſecond, 18 for the third, and 54 for the fourth and laſt payment.

41. Queſt. One béeing to haue a pit made of 10 foote déepe, agréeth with a labourer and is to giue him 10 li. for the doing of it, but when hee hath digged 8 foote

ſote the worke man falleth ſicke, and not being able to proſecute his worke deſireth content for that which he hath already done, but becauſe that the deeper hee diggeth the more labour it is, therefore the Maiſter of the worke denieth to giue him after the rate of 20 ſ. a ſote, according to the agreement made for the whole worke, but according as it may bee iudged after the proportion of eaſe, or difficulty in working betweene the top and bottome, which is then agreed that he ſhall haue in digging downeward a groat more vpon euery ſote then other, & ſo notwithſtanding that the whole Summe may come to 10 li. as aforeſayd, the queſtion is what he ſhall haue for his wages.

Anſw. The progreſſion from 1 to 9 encreaſing ſtil by 1 is 45, vnto which adding 10 ☉ the whole is 10 ☉ + 45 equall to 2400 d. or 10 li. or 1 ☉ equall to 135 $\frac{1}{3}$ d. for the firſt ſote, which being multiplyed by 8 produceth 1884, vnto which adde the exceſſe from 1 to 7 which is 28, the whole is 1912 d. or 7 li. 19 ſ. 4 d. that he is to haue at that rate for his worke ſo far done.

42. Queſt. Two friends being in company together, aske one of another how much money they haue each of them, A ſaith the $\frac{1}{7}$ of mine is as much as the $\frac{1}{8}$ of thine, and the ✓ ♃ of the $\frac{1}{7}$ of mine is as much as the ✓ ☉ of thine, the queſtion is how much money each man had.

Anſw. Suppoſe that the firſt man had 1 ☉ of Shillings, then ſhall the ſecond man haue twiſe as many for $\frac{1}{7}$ is in a double proportion to $\frac{1}{8}$, and the $\frac{1}{7}$ of A money being $\frac{1}{7}$ of a ☉, the ✓ ♃ thereof is ✓ ♃ of $\frac{1}{7}$ of a ☽ which is equall to the ✓ ☉ of 2 ☉, therefore multiply the

the ✓ ☉ of $\frac{1}{7}$ of a ☾ in it ſelfe cubickely, and the ✓ ☾ of 2 ☾ in it ſelfe ſquarely, and the products thereof will bee $\frac{1}{147}$ ☾ equall to 4 ☉, or 1 ☾ equall to 108 for the money of A, and 216 for the money of B,

43. Queſt. A certaine Captaine of a Caſtle doubting to bee beſieged within the ſame, for his better defence is deſirous to haue a trench or Ditch made about it, which hee will haue made in this proportion (viz) the length $2\frac{1}{3}$ times ſo much as the breadth, and the depth $\frac{1}{4}$ of the ſame breadth, and to bee in ſuch a proportion, notwithſtanding that the length being multiplyed by the breadth, and that product by the depth, the whole product may bee 93312 foote, the queſtion is to know the length, breadth, and depth of the ſame Ditch.

Anſw. Put for the breadth thereof 1 ☾, then ſhall the length bee $2\frac{1}{3}$ ☾, and the depth $\frac{1}{4}$ ☾, then if you multiply 1 ☾ by $\frac{1}{4}$ ☾, the product is $\frac{1}{4}$ ☉ that multiplied againe by $2\frac{1}{3}$ ☾, the product is 2 ☾ equall to 93312, which being diuided by 2 ☾ the quotient is 46606, from the ſame extract the ✓ ☾ ſo ſhall you haue 36 foote for the breadth of the Ditch, which being multiplyed by $2\frac{1}{3}$ the product is 96 for the length, then take the $\frac{1}{4}$ of the breadth which is 36 therefrom being 9, ſo reſts 27 for the depth, all which being multiplied each into other viz. 96 the length by 36, the breadth is 3456, that againe by 27, the depth makes 93312 foote for the whole contents of the ſaid Ditch.

44. Queſt.

44. Queſt. Diuide 84 into 2 ſuch parts, that if you multiply the ſquare of the leſſer number by the greater number, the product thereof may be 729, and if you multiply the ſquare of the greater number by the leſſer number, the product thereof may bee 19683, and alſo that the ✓ ℭ of theſe 2 products may make the 2 meane proportions betweene the 2 numbers produced of 84.

Anſw. Set downe for the firſt number 1 ☍, then muſt the other number bee 84 —— 1 ☍ and the ✓ ℭ of 729 is 9, which produceth the ſecond number, alſo the ✓ ℭ of 19683 is 27 for the third number, then if you multiply the firſt number by the third, the product will bee as much as if you multiply the ſecond number in it ſelfe, ſo it is plaine that 27 ☍ is equall to 81 or 1 ☍ equall to 3 for the firſt number, and 81 for the ſecond.

45. Queſt. Find 4 Numbers in a continued proportion, in ſuch ſort that if you multiply the firſt by the ſecond, that product by the third, and again that totall by the fourth, the whole Summe may be 46656, and if you multiply the firſt by the ſecond, the product may be onely 96.

Anſw. For the reſoluing of this queſtion, you muſt firſt vnderſtand that if you multiply the two middle numbers together, the product thereof will bee as much as ✓ ♃ of 46656 the totall product as by the working hereof you may more plainely ſee.

1 ☍

1 ☉	96	9216	884736
1	1 ☉	1 ☌	1 ☿

facit 884736 equall to 216, 1 ♃ equall to 4096
1 ♃

1 ♃ equall to 64, and 1 ☉ equall to 8 for the firſt, by which if you diuide 96 the quotient will be 12 for the ſecond number, and beeing that 1 ☉ is 8 therefore the Cube muſt be 512, by which if you diuide 9216 the quotient will bee 18 for the third number, and 27 for the laſt number.

46. Queſt. A certaine Nobleman hath a Garden of pleaſure, within this Garden hee hath a certaine number of Walnut trees, and loke how many trees there are, ſo many Branches or Boughes hath euery tree, and 9 of thoſe trees haue as many nuts as all the trees haue branches, and hauing gathered all the nuts from the ſaid trees, he findeth that there is in all 2187 Nuts, the queſtion is how many trees there are in the ſaid Garden.

Anſw. Set downe for the number of trees 1 ☉, then ſhall the number of Branches vpon each Tree bee alſo 1 ☉, which multiplyed each by other, produceth 1 ♃ of boughes or branches which are vpon al the ſaid trees, then ſay by the Rule of 3, If 9 trees carry 1 ♃ of branches, what ſhall 1 ☉ carry, *facit* $\frac{1}{9}$ ☌ equall to 2187, or 1 ☉ equall to 27 trees that there are in the ſayd Garden.

47. Queſt. A certaine Captaine hath vnder his command 3050 ſouldiers, of which he is deſirous to make a ſquare battaile, and in ſuch order that they may bee euery

uery one 6 ſote or a paſe, and one ſote the one from the other, the queſtion is what number of men he ſhall put in the front, and alſo what quantity of ground will containe them, beeing to bee ſet in ſuch order as afore-ſayd.

Anſw. Suppoſe that the front conſiſt of 1 ☜, that multiply by it ſelfe, and it makes 1 ☞ equall to 3050, of which if you extract the √☞ it wil be 55 for the number of men to be placed in the front, and 25 remaining to be left out.

Then for to know the quantity of ground to containe them, ſubſtract 1 from the number that is in each ranke, ſo will reſt 54, which multiply by 6 the number of féete that they are to bee one from another, and the product will bée 324 ſote, for the quantity of each ſide of the ſame ſquare battaile, which multiplied againe ſquarely into it ſelfe, produceth 104976 ſote for the whole ſquare of that péece of ground, which muſt containe them in the order afezeſaid.

Now followeth ſome few queſtions vpon the ſecond Equation, when the 2 greateſt quantities are equall to the leſſer, and conſequently of the other 2 kinds.

48. Queſt. A Marchant putteth out 250 Pounds at intereſt for 2 yeares, and at the 2 yeares end he receiueth for principall and gaine intereſt vpon intereſt 302 pounds ½, the queſtion is what the gaine of the firſt yeare amounteth vnto.

Anſw. Séeke by the Rule of proportion what 100 pound in 2 yeares doth yélde both principall and intereſt, in ſaying if 250 pound make 302 pound ½, how much

much maketh 100 pound *facit*. 121 pound. Then for the ſecond worke put 1 ☉ for the gaine of 100 li. for the firſt yeare, and ſay by the rule of 3, if 100 li. make 100 pound + 1 ☉, what ſhall 100 li. + 1 ☉ make *facit* 100 pound + 2 ☉ + $\frac{1}{100}$ ☽ equall to 121 or 12 00 equall to 10000 + 200 ☉ + 1 ☽, or 2100 equall to 1 ☽ + 200 ☉, then if you multiply the halfe of 200 ☉ in it ſelfe, the product thereof will be 10000, vnto which if you adde 2100 the totall will be 12100, then extract the √ ☽ thereof which is 110, from the ſame ſubſtract 100 which is the $\frac{1}{2}$ of 200, ſo the remainer is 10 li. for the gaine of 100 pound for the firſt yeare.

49. Queſt. A Marchant buyeth a Cloath for a certaine ſumme of money, and ſelleth it againe for 17 $\frac{1}{4}$ pound, by which hee gaineth in the 100 li. ſo employed as much as the Cloath coſt him, the queſtion is how much the ſaid cloath coſt him at the firſt.

Anſw. Suppoſe that it coſt him 1 ☉, and ſay if 100 pound yeeld 100 li. + 1 ☉, what ſhall 1 ☉ yeelde, *facit* 1 ☉ + $\frac{1}{100}$ ☽ equall to 17 $\frac{1}{4}$ pound, or 1725 equall to 100 ☉ + 1 ☽, which by Reduction makes 1 ☉ equall to 15 pound for the price of a cloath.

50. Queſt. A Marchant buyeth a certaine number of Clothes, for which hee payeth 120 pound, and hee hath them at ſuch a rate, that if hee ſhould haue 6 clothes more for the ſame money, then would they bee better cheape to him by 20 ſhillings, or 1 Pound in a Cloth. The queſtion is how many clothes he bought for his ſaid 120 Pound.

Anſw. Put for the number of Clothes 1 ☉ and ſay, if 1 ☉ of Clothes coſt 120 pounds, what 1 Cloth

facit.

facit. 120, then ſeeke how much a Cloath ſhall coſt hauing 1 ☉ +6 clothes more for 120 ℔. ſaying if 1 ☉ +6 clothes coſt 120 ℔. what ſhall 1 Cloth coſt *facit.* $\frac{120}{1☉+6}$ which maketh 1 Reſolue then $\frac{120}{1☉+6}$ therefore and there ſubſtract $\frac{120}{1☉+6}$ from $\frac{120}{1☉}$ will reſt $\frac{120}{1☉}$ 0 1 equall to 1 pound, $\frac{720}{1☉+6}$: ☉ + 6 equall to 720, which makes 1 ☉ equall to 24 for the number of clothes that he hath bought.

51. Queſt. There are 2 numbers each differing from 3 in ſuch proportion, that if you multiply the one by the other, the product will be 54, I demaund what 2 numbers they are.

Anſw. Put for the one 1 ☉, then ſhall the other be 1 ☉ + 3, which multiplied each by other produceth 1 ▢ + 3 ☉ equall to 54, or 1 ☉ equall to 6 for the one number, vnto which if you adde 3 the totall is 9 for the ſecond number.

52. Queſt. Find ſuch a number vnto which if you adde his owne ſquare, the whole product may bee 35 ¼.

Anſw. Suppoſe the number to be 1 ☉, then ſhall the ſquare thereof be 1 ▢, which added thereto makes 1 ▢ + 1 ☉ equall to 35 ¼, which by reduction makes 1 ☉ equall to 5 ½ for the number deſired.

53 Queſt. There are 2 numbers which doe differ each from other by 2, and if you multiply each of them in it ſelfe cubickely, and againe the products each by other, the totall product thereof will be 3375: the queſtion is what the ſaid 2 numbers are?

Anſwere. Put for the one number 1 ☉, then ſhal the

other number be 1 ☉ + 2, then extract the ✓ ☉ of 3775 ſo ſhall you haue 15 equall to 1 ☽ + 1 ☉, and 1 ☉ equall to 3 for the leſſer number, vnto which if you adde 3, the totall is 5 for the ſecond number.

¶ Queſtions vpon the third Equation, when the greateſt and leaſt quantitie is equall to the meane.

54. Queſt. TWo Marchants being in company, A putteth in a certaine Summe of money, and B putteth in 180 pound, A gaineth with his money 40 Pound, B gaineth alſo a certaine Summe of money in ſuch ſort that the principall of A and B with both their gaines amounteth together to 400 pound, I demaund the principall of A, and the gaine of B.

Anſw. Put for the principall of A 1 ☉ that adde vnto 40 pound which is his gaine, and therewith alſo the principall of B which is 180 pound. So is the totall Sum 1 ☉ + 220 pound, the ſame ſubſtract from 400 pound which is all their principall and gaine, the remaine is 180 pound — 1 ☉ for the gaine of B, then as 1 ☉ hath proportion to 40, ſo hath 180 to 180 — 1 ☉, which being multiplyed and diuided according to the rule there wilbe 1 ☽ + 7200 equall to 180 ☉, then multiply the halfe of 180 in it ſelfe, the product will be 8100, from which ſubſtract 7200 and of the

the remainer which is 900 extract the ✓ ☉, ſo ſhall you haue 30 which taken from 90 the halfe of the number of ☌, there then reſts 60 for the value 1 ☌, which is the principall of A, that added with 40 li. his gaines make 100 pound, which with the principall of B makes 280 pound together, all which taken from 400 li. both their principall and gaine leaueth 120 li. for the gaine of B.

55. Queſt. A Cittizen buyeth a houſe for a certaine ſum of money, and ſelling the ſame againe for 64 li. loſeth by it after the rate of $\frac{1}{5}$ in the hundred, the queſtion is what the houſe coſt him at the firſt.

Anſw. Suppoſe that the houſe coſt him 1 ☌ of a li. from which ſubſtract 64, reſts 1 ☌ — 64, then ſay if 100 loſe $\frac{1}{5}$ ☌, how much ſhall 1 ☌ loſe, *facit.* $\frac{1}{500}$ ☉ equall to 1 ☌ — 64, or 400 ☌ equall to 1 ☉ + 25600 or 1 ☌ equall to 80 li. that the ſaid houſe coſt him at the firſt.

56. Queſt. There are 2 meſſengers A and B which depart at an inſtant from 2 ſeuerall places, the one towards the other, and at their meeting together ſaith A vnto B, I find that I haue gone 20 miles more then you haue done, and I haue gone as much way in $6\frac{2}{3}$ dayes, as you haue hitherto, B ſaith I beleeue it wel, I am no very good foot-man, but I find that I haue yet 15 daies to goe the way that you haue come, if I trauaile euery day as much ground as I haue hitherto. The queſtion is, how many miles the 2 places are aſunder, and how many miles each of them haue gone at that time.

Anſw. Suppoſe that all the diſtance is 1 ☌ of miles of which A hath gone $\frac{1}{2}$ ☌ + 10, and B hath

gene $\frac{1}{3}\mathcal{Z} - 10$, then ſay if $6\frac{2}{3}$ daies giue $\frac{1}{3}\mathcal{Z} - 10$ what 1 day *facit*.

$\frac{1}{3}\mathcal{Z} - 10$

$6\frac{2}{3}$.

miles which A goeth in one day, againe ſay if 15 daies giue $\frac{1}{3}\mathcal{Z} + 10$ miles, what 1 day *facit* $\frac{1}{45}\mathcal{Z} + \frac{2}{3}$ miles which B goeth in one day,

$\frac{1}{45}\mathcal{Z} + \frac{2}{3}$

15

then worke againe, and ſay if $\frac{1}{3}\mathcal{Z} + 10$ giue 1 day what $\frac{1}{3}\mathcal{Z} - 10$ *facit* $7\frac{1}{2}\mathcal{Z} - 15$

$\frac{1}{3}\mathcal{Z} + 10$

dgies, then ſay againe if $\frac{1}{3}\mathcal{Z} - 10$ giue one day, what

$6\frac{2}{3}$

$\frac{1}{3}\mathcal{Z} + 10$ *facit* $3\frac{1}{3}\mathcal{Z} - 66\frac{2}{3}$ which are equall to $7\frac{1}{2}\mathcal{Z} - 150$

$3\frac{1}{3}\mathcal{Z} - 10$ makes $1\frac{7}{8}\mathcal{Z} + 400$

$3\frac{1}{3}\mathcal{Z} + 10$

equall to $104\mathcal{Z}$, and $1\mathcal{Z}$ equall to 3 miles, for all the diſtance, from which ſubſtract 20 reſts 80 of which the $\frac{1}{3}$ is 40 for A and 60 for B, againe diuide 60 by 15 the quotient is 4 miles that B goeth in a day: alſo diuide 40 by $6\frac{2}{3}$ the quotient is 6 for the miles that A goeth in a day.

¶ The fourth Equation when the greateſt quantity is equall to the 2 leſſer.

57. Queſt. A Marchant buyeth a certaine number of Clothes for 270 pounds, in ſuch ſort that if hee had bought 5 cloathes leſſe, euery cloth had coſt him $\frac{1}{4}$ pound more. The queſtion is how many cloths

thes he bought, and what each clothe coſt him.

Anſw. Put caſe that he bought 1 ☉ of clothes, and ſay if 1 ☉ coſt 270 pound, what 1 *facio* 270 then ſay againe if 1 ☉ — 5 coſt 270 pound, what 1 ☉ *facio* 270 from which ſubſtract 270 and ther will remaine 1350 — 1 ☉ equall to 1 ☉ 3 ☽ — 270 — 3 ☽ equall to 5 ☉ + 1080, and 1 ☉ equall to 45 — 1 ☽ — to 5 ☉ clothes which is 6 li. the cloth, and if he had bought but 40 clothes for 270 pound, they had then coſt 6 pound 15 ſ. the piece.

58. Queſt. What number is that of which the ½ being multiplied by, and ⅓ of itſelfe the product againe by ¼ of itſelfe, and that totall againe by the ½ thereof, the whole product may be equall to 1 ☉ + 6 ☽.

Anſw. Set downe for the ſaid number 1 ☉ whoſe ⅓ is ⅓ ☉ and the ½ thereof is ⅙ ☉, which multiplyed one by the other makes 1/18 ☽, that multiply by ¼ ☉ makes 1/72 ☉ which multiplied by ½ ☉ the whole product is 1/144 ☽ ☽ equall to 1 ☉ + 6 ☽ or 1 ☽ ☽ equall to 864 ☉ + 48 ☽, or 864 ☉ + 48 equall to 1 ☽ ☽ which is 1 ☉ equall to 12 the number deſired.

59. Queſt. There are 2 numbers differing from 2 in ſuch manner that if the one bee multiplyed by the other, and the product diuided by 6, the quotient may bee as much as if you multiply the ⅓ of the leſſer number in it ſelfe cubickely.

Anſw. Let the firſt number bee 1 ☉, then muſt the other be 1 ☉ + 2 which multiplyed the one by the other the product is 1 ☽ + 2 ☉, that diuided by 6 bringeth 1 ☽ + 2 ☉ / 6 then take ⅓ of the leſſer nũber which is ⅓ ☉ & multiply in it ſelfe cubickely makes 1/27 ☉

equall to 1 ☉ + 2 ☽ or $\frac{5}{27}$ ☾ equall to 1 ☉ + 2 ☽ or $\frac{5}{9}$ ☉ equal —— to 1 ☽ + 2, or 2 ☉ to 9 ☽ + 18, or 1 ☉ to 6 4$\frac{1}{2}$ ☽ + 9, and 1 ☽ equall to 6 for the leſſer number vnto which 2 being added makes 8 for the greater number deſired.

60. Queſt. What number is that which if you multiply the ☉ thereof by 2, and the product thereof by $\frac{1}{4}$ of the ſame number, the product may by 8 times ſo much as the number propoſed, and likewiſe 4 times as much as his owne ☉ amounteth vnto.

Anſw. Propoſe the number to be 1 ☽, of which the ☉ multiplied by 2 makes 2 ☉, that multiplied againe by $\frac{1}{4}$ ☽ produceth $\frac{1}{2}$ ☾ equall to 8 ☽ + 4 ☉ which are produced of the multiplication of 8 by 1 ☽, and the ☉ of a ☽ by 4, then diuide the 3 quantities by ☾ and there will come $\frac{16}{1}$ ☽ + $\frac{8}{1}$ ☉ equall to 1 ☾, multiply then the $\frac{1}{2}$ of the ☉ number in it ſelfe, and adde the product with the ☽ number, the totall will be $\frac{64}{9}$ of which the ✓ ☉ is 2 $\frac{2}{3}$, which added with the $\frac{1}{2}$ of the number ☉ (viz.) $\frac{8}{3}$ ☉ the product will bee 4 which is the number deſired.

FINIS.

An. Dom. 1621.

THE IOVRNALL

OR

Dayes Booke marked with the Letter

A

Money to be first written.

1 CASH is Debitor vnto Stocke 2000 li. and is for so much money remaining in Chest at this
2 present, God sending fortune to deale with it ——— 2000 00 00

To write Debitors.

1 Peter Iohnson is Debitor vnto
3 Stocke to pay the 15 of this moneth by Will ——— 400 00 00

1 Iohn Clauson is Debitor vnto
3 Stocke to pay the last of Ianuary by Will ——— 600 00 00

To write Creditors.

5 Stocke is debitor to Peter Garretson, and is for so much payable by
3 bond, the 20 of this moneth ——— 900 00 00

6 Stocke is debitor to Gouert Iohnson due to him the last of Ianuary — 200 00 00
1

To write Wares in the house.

1 Peale in Barrels is Debitor vnto
4 Stocke for 16 Tunnes remaining in the house ——— 736 00 00

Rye is debitor to Stocke for 20
1 Tuns at 55 li. 10 s. the Tun in the
4 house ——— 1110 00 00

1	Linnen cloth is Debitor to Stocke			
5	for 18 péces remaining in the house, at 17 li. 5 s. the péce	510	00	00
	Ianuary. 2.			
	To sell for ready money.			
4	Money is Debitor to Rye for 8			
2	Tuns sold vnto Hans Croome at 60 li. the Tunne	480	00	00
	To sell for time.			
4	Nicholas de Reo is Debitor to Rie			
6	for 6 Tunnes, at 48 li. the Tunne to pay the last of this moneth	348	00	00
	Ianuary. 15.			
	Part for money, part for time.			
4	Harman Iohnson is Debitor vnto			
7	Rye for 6 Tuns, to pay 8 li. ready money, the rest y first of March next	360	00	00
7	Money is debitor to Harman Iohn-			
2	son receaued in part of 6 Tunnes of Rye	84	00	00
	To receiue a debt.			
3	Money is debitor to Peter Iohn-			
2	son, receiued in full of a bill due this present day	400	00	00

To

To paye a debt.

2 5 Peter Garetſon is debitor to money payed him in full of a bond due this preſent day ——— 900 00 00

Ianuary. 31.

To paye a debt by aſſignement.

3 6 Gouert Iohnſon is debitor to Iohn Clauſon which he hath receiued by aſſignement ——— 200 00 00

3 1 Money is Debitor to Iohn Clauſon receiued in full of his Bill due the 15 of this moneth ——— 400 00 00

To enter the profit of a debt prolonged.

7 6 Nicholas de Reo is debitor to profit and loſſe for the intereſt of 313 li. due this preſent day, for time of forbearance till the laſt of Febr. next —— 02 18 00

February. 4.

To enter money lent.

2 8 Iohn Seuenſlapper is Debitor to money for ſo much lent him, to paye the laſt of this moneth ——— 300 00 00

2 4 Rye is debitor to money payed to Michaell Williamſon for 10 Tunnes at 50 li. the Tunne ——— 500 00 00

February. 10.

Rye is Debitor to Peter Bloome

8/4	for 10 Tuns at 55 li. the Tunne to pay the 18 of this moneth———	550	0000
	February. 24.		
4/9	Voyage to Lisborne is debitor to Rye for 20 tuns laden in the Ionas of London, and directed to Hans Cardinall Factor———	1050	0000
	February. 25.		
2/9	Voyage to Lisborne is debitor to Money payd for seuerall charges for 20 Tunnes of Rye———	100	0000
2/9	Voyage to Lisborne is debitor to Money payd vnto Iohn Seuenslapper to assureme 20 Tuns of Rye at 5 li. the hundred, as by the policy appea.—	75	0000
	March. 1.		
	To deliuer money vpon hazard.		
2/9	Iohn Cleane is debitor to mony deliuered him vpon aduenture to pay in Danske to Hans Greene Factor———	210	0000
7/9	Iohn Cleane is debitor to profit & losse which he is to pay in Danske for the profit of money by exchange———	30	0000
	March. 4.		
	To buy wares, part money, part assignement.		
10/5	Linnen cloth is Debitor to Allert Scatter for 25 peces at 20 li. ℔ pece—	450	0000

Allert

6 / 10	Allert Scatter is Debitor to Nicholas de Reo payed him by aſſignement		350	18 00
2 / 10	Allert Scatter is debitor to money payed in full of Linnen cloth aboue mentioned		150	02 00
	March. 15.			
	Wares deliuered in barter.			
5 / 6	Nicholas de Reo is debitor to Linnen cloath for 15 peeces at 20 fl. the peece in barter		300	00 00
6 / 4	Meale in Barrels is debitor to Nicholas de Reo for 6 Tunnes at 44 fl. the Tunne in barter of Linnen cloth aboue mentioned		264	00 00
6 / 2	Money is debitor to Nicholas de Reo received in full of the barter		36	00 00
	March. 16.			
	To receiue wares for a debt, and pay the ouerplus in money.			
8 / 4	Meale in barrels is debitor to Iohn Seuenſlapper for 8 Tunnes at 45 fl. the Tunne, receaued in payment of his debt		360	00 00
2 / 8	Iohn Seuenſlapper is Debitor to money payd him for the ouerplus of his meale		60	00 00

To write goods assured, lost at Sea, and to recouer money for them.

John Seuenſlapper is Debitor to Aſhborne voyage, for that I haue receiued a lettter from thence that Iohn Garterſon in foule weather at Sea was forced to caſt ouer-board certaine goods whereof my part came to —— 300 00 00

Mony is debitor to Iohn Seuenſlapper receiued for goods that he aſſured— 300 00 00

Aprill. 20.

Rye is debitor to Linnen cloth for 6 Tuns receiued of Iohn Bloothurſt in barter of 16 peeces at 26 li. 5 s. the peece —— 420 00 00

Profit and loſſe is debitor to Linnen cloth for 1 peece giuen to Peter Martſon —— 08 12 06

Aprill. 31.

To take vp money vpon intereſt.

Money is debitor to John Clauſon borrowed vpon intereſt to pay the laſt of December next —— 400 00 00

Profit and loſſe is debitor to Iohn Clauſon for the intereſt of 400 li. — 16 00 00

May. 1.

To receiue a debt after it is due with intereſt for it.

Harman Iohnſon is Debtor to profit

7	profit & losse for the interest of 277 li.			
7	for 2 moneths	05	00	00
	Money is debitor to Harman Iohnson for a debt receiued of him with			
7	interest due the last of March	281	00	00
	Maye. 8.			
	To enter money receiued by my Factor that I deliuered at hazard.			
9	Hans Greene is Debitor to Iohn Cleane for so much payed him in			
10	Danske, which I deliuered here	240	00	00
	Maye. 15.			
	To enter money deliuered by my Factor at hazard.			
10	Peter Iohnson is debitor to Hans Greene payed him in Danske to be			
3	payed here	240	00	00
	Peter Iohnson is debitor to profit and losse, for profit of money by ex-			
7	change	22	17	02
	Maye. 31.			
	To sell a debt.			
	Money is debitor to Peter Iohnson			
7	receiued of Iacob Garretson for his			
2	Bill of 262 li. 17 s. 2 d. which I			
	haue sold for ready money	258	00	00
	Profit and losse is debitor to Peter			
3	Iohnson, which is lost in sale of his			
7	Bill	04	17	02

To

To enter money gotten by money payd.

7 2 Money is Debitor to profit and loſſe for the profit of 200 Piſtolets ſold for money———— 10 00 00

Iuly. 8.

To enter goods ſold by your Factor vpon aduice receiued.

9 10 Hans Cardinall is debitor to voyage of Lisborne, for ſo much he hath ſold his Rye for free of all charges— 156 00 00

Iune. 4.

To receiue goods and ſell it for another man.

12 11 Wheat is Debitor to Hans Kemerling for 20 Tuns receiued to his own account at 60 li. the Tun——— 1200 00 00

2 11 Hans Kemerling is debitor to money payd for fraight, primage, pilotage, meaſuring, cuſtome, lyterage, carriage to warehouſe, and all other charges ——————— 191 15 08

12 12 Aſhes are debitor to Hans Kemerling for 7 Tunnes, 10 Barrels, receaued to his owne account——— 400 00 00

2 12 Ha: Kemerling is debitor to money payd for ſeuerall charges for aſhes— 37 18 00

To

To ſell wares part for money, the reſt by another mans Bill.

4	Peter Iohnſon is Debitor to Rye			
3	for 6 Tunnes at 55 li. the tunne, to pay part money part a debt aſſigned—	330	00	00
3	Nicholas de Reo is debitor to Peter Iohnſon for a Bill receaued,			
6	which I haue accepted in part of Rye aboue mentioned ——— ———	268	00	00
3	Money is debitor to Peter Iohnſon			
2	receiued in full of Rye aboue mentioned ———	62	00	00

Iune. 22.

To enter money taken vp by exchange.

6	Money is debitor to Gouert Iohn-			
2	ſon, receiued of him by exchange, to be payd in Danske by my Factor Hans Greene vnto Hans Cocke his man vpon ſight of my Bill——— ——	300	00	00
6	Profit and loſſe is debitor to Gouert			
7	Iohnſon, which I am to pay for brokerage for taking vp the mony at 1 d. the pound ——— ———	001	05	00
2	Hans Iohnſon is debitor to money			
13	payd him by exchange to be payed in Danske vnto Hans Greene Factor, at ſight of my Bill——— ———	140	00	00

Hans

7 / 13	Hans Iohnſon is debitor to profit and loſſe, which he is to pay for profit of money by exchange in Danske vnto the ſaid Hans Greene	10	04	08
	Iune. 30. To enter a debt loſt by a Bankrout.			
6 / 2	Money is debitor to Nicholas de Reo receiued in ready money in part of his debt	168	00	00
7 / 6	Profit and loſſe is debitor to Nicholas de Reo for ſo much giuen him when he broake	100	00	00
	Iuly. 12. To enter goods receiued from your Factor.			
11 / 13	Saffron is debitor to Hans Cardinall for 4 Balls waying, viz. N. 1. 78 li. N. 2. 79. li. N. 3. 82. li. N. 4. 84 li. all is 324 li. which coſt	1420	00	00
2 / 13	Saffron is debitor to money for ſo much payd for freight and cuſtome of 4 Balls	12	00	00
	Iuly. 22. To enter goods loſt at Sea.			
11 / 7	Profit and loſſe is debitor to Hans Cardinall for 1 Bale of Pepper ſent by him from Lisborne in Iohn Pren, which was taken at Sea by Rouers—	140	00	00

To

To enter money by exchange paid my Factor.

10 / 6 Gouert Iohnſon is Debitor to Hans Greene for ſo much I haue receiued heere which was payd Hans Cocke his man in Danske —— 301 05 04

August. 20.

To enter money by exchange receiued by my Factor.

7 / 10 Hans Greene is Debitor to Harman Iohnſon for ſo much hee receiued of him in Danske which I deliuered here by exchange, to bee payed there —— 460 04 00

To enter a Bill of exchange, receiued to another mans account.

10 / 3 Peter Iohnſon is Debitor to Hans Greene for a Bill of exchange, receiued to his owne account, payable by the ſaid Peter at all times —— 600 00 00

3 / 2 Money is Debitor to Peter Iohnſon receaued in full of a Bill of exchange —— 600 00 00

September. 15.

To ſell goods for another man, part money, part time.

Allert Scatter is debitor to Wheat for 20 Laſts at 80 ℔. the Laſt, ſolde him for the account of Hans Kemerling,

11	ling, to pay 1500 li. ready mony, the				
10	reſt the laſt of October next ——	1600	00	00	
	Money is debitor to Allert Scatter				
10	receiued for the account of Hans Ke-				
2	merling in part of wheat aboue men-				
	tioned ——	1500	00	00	
	September the laſt.				
	Peter Bloome is debitor to Aſhes				
12	for 7 Tuns 10 Barrels, ſold him for				
8	the account of Hans Kemerling ——	496	00	00	
	Linnen cloth is debitor to Money				
2	for ſo much payed Lambert Roote for				
5	whiting and folding ——	16	00	00	
	October. 15.				
	To enter goods ſent by Sea for an				
	other mans account.				
	Hans Kemerling is Debitor vnto				
13	Saffron for 2 bales 157 li. ſent him				
12	by Giles Isbrands Shippe ——	785	00	00	
	Money is debitor to Allert Scatter,				
10	receaued of him for the account of				
12	Hans Kemerling ——	100	00	00	
	December. 15.				
	To enter charges payed for wares				
	for another mans account.				
	Hans Kemerling is debitor to Mo-				
2	ney for ſo much payed for ſeuerall				
12	charges for his Wheat ——	24	06	10	

Hans

2	Hans Kemerling is Debitor vnto			
12	Money payed for ſeuerall charges for			
	Aſhes	02	1500	
2	Rye is Debitor to money payd for			
4	ſeuerall charges	47	0500	

December. 18.

2	Profit and loſſe is debitor to mony			
7	for ſeuerall charges from the firſt of			
	January to this day	350	0000	
	Profit and loſſe is debitor to mony			
2	for ſo much loſt by paiments of mony			
7	by reaſon of riſing and falling	14	1600	

FINIS.

An. Dom. 1621.

THE LEAGER

OR

Booke of Debitor and Creditor, marked with this Letter

A

The Regiſter vnto the Leager.

A

Alert Scatter ——— 10
Aſhes ——— 12

B

C

Caſh ——— 2

D

E

F

G

Gouert Iohnſon ——— 6

H

Harman Iohnſon ——— 7
Hans Iohnſon ——— 13
Hans Kemerling ——— 12
Hans Cardinall ——— 11
Hans Greene ——— 10

I

Iohn Clauſon ——— 3
Iohn Seauenſlapper ——— 8
Iohn Cleane ——— 9

K & L

Linnen cloth ——— 5

M

Meale ——— 4

N

Nicholas de Reo ——— 6

O & P

Peter Iohnſon ——— 3
Peter Garretſon ——— 5
Profit and loſſe ——— 7
Peter Bloome ——— 8

Q & R

Rye ——— 4

S

Stocke ——— 1

T & V

Voyage to Lisborne ——— 9

W

Wheate ——— 11

X, Y, & Z.

M.	D	1621. No. 1.	F.	L.	S.	D
Ian.	1	Stocke ought to giue to Peter Garretson payable by Bond the 20 day of this moneth, Cre.	5	900	00	00
	1	To Gouert Iohnson due the last of this moneth, Cre.	5	200	00	00
Dec	31	To Ballance of account, Cre.	14	4313	16	04

Summe — 5413 — 16 — 4

M.	D		F.	L.	S.	D
Ian.	1	Stocke ought to haue of money for ſo much in the houſe at this preſent in Engliſh coyne, Deb.	2	2000	00	00
	1	Of Peter Iohnſon for a debt he oweth, Deb.	3	400	00	00
	1	Of Iohn Clauſon for a debt he oweth, Deb.	3	600	00	00
	1	Of Weale for 16 tuns at 46 pound the tun remaining in the houſe, Deb.	4	736	00	00
	1	Of Rye for 20 tuns at 55 pounds 10 ſhil. the tun in the houſe, Deb.	4	1110	00	00
	1	Of Linnen cloth for 18 peeces at 17 pounds 5 ſhillings the peece in the houſe, Deb.	5	310	00	00
Dec	1	Of profit and loſſe for ſo much gained by this yeares account, Deb.	7	257	16	04

Summe—5413—16—4

M.	D	1621. No. 2.	F.	L.	S.	D
Ian.	1	Money is debitor and ought to giue vnto ſtocke for ſo much remaining in the houſe of Creditor— ——	1	2000	00	00
	2	To Rye for 8 Tunnes Cre——	4	480	00	00
	15	To H. Iohnſō receiued in part of Rye	7	83	00	00
	15	To Peter Iohnſon for a debt receiued	3	400	00	00
	31	To Iohn Clauſon for a debt receiued	3	400	00	00
Ma.	15	To Nich. de Reo receiued in money	6	3[illegible]	00	00
Apr.	15	To I. Seuenſlapper receiued for goods	8	300	00	00
	30	To Io Clauſon ouerſeed at intereſt	3	400	00	00
May	1	To Har Iohnſon for a debt receiued	7	282	00	00
	30	To P Iohnſon receiued of I Garreſt.	3	258	00	00
Iune	30	To Profit & loſs for profit in exchange	7	10	00	00
	8	To P Iohnſon receiued in full of Rye	3	62	00	00
	22	To G Iohnſon receiued by exchange	6	500	00	00
	30	To Nicholas de Reo receiued a debt—	6	168	00	00
Aug	20	To Peter Iohnſon as in Creditor—	3	600	00	00
Sept	15	To A. Skatter receiued for H K. Cr.-	10	1500	00	00
	15	To A. Skatter receiued for H.K. Cr.—	10	100	00	00

Summe — 7379 — 00 — •

M.	D		F.	L.	S.	D
Ian.	20	Money aught to haue of Peter Garretſon payd in full of a deb: Debitor	5	900	00	00
Feb.	4	Of Iohn Seuenſlapper lent him	8	300	00	00
	4	Of Rye payd to Michaell Williamſon	4	500	00	00
	24	Of I. Seuenſlapper paid for aſſurance	9	75	00	00
	24	Of Rye for charges. Debitor	9	100	00	00
Mar	1	Of I. Cleane to be paid Hans Greene	9	2	00	00
	4	Of Allert Skatter Debitor	10	149	02	00
	16	Of Iohn Seuenſlapper Debitor	8	60	00	00
Iune	4	Of Hans Kemerling for charges	12	191	15	08
	4	Of Hans Kemerling for charges	12	37	18	00
	12	Of Hans Iohnſon by exchange	13	450	00	00
Iuly	12	Of Saffron paid for charges	13	1	00	00
Oct.	15	Of Linnen cloth paid for workem.	5	16	00	00
Dec.	16	Of Hans Kemerling for charges	12	24	06	10
	6	Of Hans Kemerling for charges	12	2	15	00
	6	Of Rye for charges Debitor	4	47	05	00
	18	Of profit and loſſe for charges	7	350	00	00
	18	Of profit and loſſe loſt in payment	7	14	16	00
	31	Of Wallance of account for ſo much reſting in the houſe	13	3938	01	06

Summe—7379—00—0

M.	D	(1621. No. 3.)	F.	L.	S.	D
Ian.	1	Peter Iohnſon ought to giue by his Bill payable the 15 of this moneth, Cre.	1	400	00	00
Mar	15	To Hans Greene by exchange	10	240	00	00
	15	To profit and loſſe by exchange	7	22	17	02
June	8	To Rye for 6 Tuns at 51 pounds the Tun to pay part by aſſignement, the reſt in money, Cre.	4	330	00	00
Aug	20	To Hans Greene by exchange	10	600	00	00
		Summe—1592—17—2				

M.	D	(1621. No. 3.)	F.	L.	S	D
Ian.	1	Iohn Clauſon ought to giue for a debt payable by Bill the laſt of this Moneth, Cre.	1	600	00	00
Apr	30	To Money lent payable the laſt of December next	2	400	00	00
De.	31	To Ballance of account which I reſt indebted, Cre.	14	416	00	00
		Summe—1416—00—0				

M.	D	(1621. No. 3.)	F.	L.	S.	D
Ian.	15	Peter Iohnſon ought to haue of money receiued in full of a debt	2	400	00	00
May	30	Of money for a Bill of exchange ſold to Iohn Garretſon, Deb.	2	258	00	00
	30	Of profit and loſſe loſt in ſale of his Bill of exchange	7	04	17	02
Iune	8	Of a Bill of Nicholas de Reo to me aſſigned, Deb.	6	368	00	00
	8	Of Money receaued in full of Rye	2	62	00	00
Au.	20	Of Money receaued for a Bill of exchange	2	600	00	00
		Summe—1592—17—2				

M.	D	(1621. No. 3.)	F.	L.	S.	D
Ian.	31	Iohn Clauſon ought to haue for ſo much paid Gouert Iohnſon by aſſignment, Deb.	6	200	00	00
	31	Of Money receaued in full of a debt	2	400	00	00
Apr.	30	Of money miſ-entred per contra.	0	400	00	00
	30	Of money borrowed vpon intereſt, to pay the laſt of December.	2	400	00	00
	30	Of Profite and loſſe for the vſe of 400 pounds, Deb.	7	16	00	00
		Summe—1416—00—0				

M.	D	(1621. No. 4.)	F.	L.	S.	D
Ian.	1	Meale in Barrels ought to giue				
		for 16 Tuns at 46 li. the Tun, Cr.	1	736	00	00
Mar	15	To Nicholas de Reo at 44 pounds				
		the Tun, Deb.	6	264	00	00
	16	To Iohn Seuenſlapper at 45 pound				
		the Tun, Deb.	8	360	00	00
		Summe—1360—00—0				

M.	D	(1621. No. 4.)	F.	L.	S.	D
Ian.	1	Rye ought to giue for 20 Tuns at				
		55 pounds 10 ſhil. in the houſe	1	1110	00	00
Feb.	4	To Money for 10 Tuns at 50 li.				
		the Tunne, Cre.	2	500	00	00
	10	To Peter Bloome for 10 Tuns pa-				
		able the 18 of this moneth, Cre.	8	550	00	00
Apr.	20	To Iohn Blothurſt for 6 Tuns in				
		Barter of Linnen cloth, as in Cre.	5	420	00	00
Dec	16	To Money for Charges, Deb.	2	47	05	00
		Summe—2627—5—0				

M.	D	(1621. No. 4.)	F.	L.	S.	D
De.	31	Weale ought to haue for 30 tuns brought to ballance, as in Deb. ——	14	1360	00	00

Summe—1360—00—0

M.	D	(1621. No. 4.)	F.	L.	S.	D
Ian.	2	Rye ought to haue of Money for 8 Tuns sold to Hans Croome, Deb. —	2	480	00	00
	2	Of Nicholas de Reo for 6 Tuns—	6	348	00	00
	15	Of Harman Iohnson for 6 Tuns—	7	360	00	00
Feb.	24	Of Lisborne voyage for 20 Tuns, Debitor —— —— —— ——	9	1050	00	00
Iune	8	Of Peter Iohnson for 6 Tuns——	3	330	00	00
	16	Of profit and losse lost by this accompt, and carried to ballance, Deb.—	7	59	05	00
De.						

Summe—2627—05—0

M.	D	(1621. No. 5.)	F.	L.	S.	D
Ian.	1	Linnen cloth ought to giue for 18 pieces in the house at 17 pounds 5 shillings the piece, Cre.	1	310	10	00
Mar	4	To Allert Skatter for 25 pieces at 20 pounds the piece, Cre.	10	500	00	00
		To money for charges, Cre.	02	16	00	00
Dec	31	To profit and losse gained by this account, Cre.	7	132	02	00
		Summe — 958 — 12 — 00				

M.	D	(1621. No. 5.)	F.	L.	S.	D
Ian.	20	Peter Garetson ought to giue to money payed him in full of a debt per contr.	2	900	00	
		Summe — 900 — 00 — 0				

M.	D	(1621. No. 5.)	F	L.	S.	D
Mar	15	Linnen cloth ought to haue of Nicholas de Reo for 15 peeces in barter at 20 pounds the peece, Deb.	6	300	00	00
Apr.	20	Of Rye for 16 peeces in barter, D.	5	420	00	00
	20	Of profit and losse for $\frac{1}{2}$ peece giuen Peter Martson	7	8	12	00
Dec	31	Of Ballance of account for 11 peeces remaining, rated at 20 li. ℔ peece.	14	230	00	00
		Summe—958—12—00				

M.	D	(1621. No. 5.)	F.	L.	S.	D
Ian.	1	Peter Garretson ought to haue by bond payable the 20 day of this moneth, Deb.	1	900	00	00
		Summe—900—00—0				

M.	D	(1621. No. 6.)	F.	L.	S.	D
Ian.	31	Gouert Iohnſon ought to giue vnto Iohn Clauſon by aſſignment in full a Bull againſt Cre.	3	200	00	00
Au.	14	To Hans Greene payed him in Danske, Cre.	10	301	05	04

Summe—501—5—4

M.	D	(1621. No. 6.)	F.	L.	S.	D
Ian.	2	Nicholas de Reo ought to Rye for 6 Tuns at 58 pounds the Tunne, to pay the laſt of this moneth, Cre.	4	348	00	00
	31	To profit and loſſe for a moneths forbearance, Cre.	7	2	18	00
Mar	15	To Linnen cloth for 15 peeces at 20 pounds the peece in barter	5	300	00	00
Iune	8	To Peter Iohnſon for a debt aſſigned, Cre.	3	268	00	00

Summe—918—18—00

M.	D	(1621. No. 6.)	F.	L.	S.	D
Ian.		Gouert Iohnſon ought to haue by Bond, payable the laſt of this Moneth, Deb.	1	200	00	00
Iune	22	Of money receaued by exchange to be paid in Danske, Deb.	2	300	00	00
	22	Of Profit and loſſe gotten by exchange, Deb.	7	1	05	04
		Summe—501—5—4				

M.	D	(1621. No. 6.)	F.	L.	S.	D
Mar.	4	Nicholas de Reo ought to haue of Allert Seatter, payed him by aſſignement, Deb.	10	350	18	00
	15	Of Meale for 6 Tuns	4	164	00	00
	15	Of Money, Deb.	2	36	00	00
Iune	30	Of Money, Deb.	2	168	00	00
	30	Of profit and loſſe giuen him when he broke, Deb.	7	100	00	00
		Summe—918—18—00				

M.	D	(1621. No. 7.)	F.	L.	S.	D
Ian.	15	Harman Iohnſon is Debitor and ought to giue to Rye for 6 Tuns at 60 pounds the Tun, to pay part maney, the reſt the firſt of March next Cre.	4	360	00	00
May	1	To profite and loſſe for intereſt of 277 pounds for 2 moneths, Cre.	7	5	00	00
Iune	22	To Money by exchange, Cre.	2	450	00	00
	22	To profite and loſſe gotten by exchange	7	10	04	08

Summe—825—4—8

M.	D	(1621. No. 7.)	F.	L.	S.	D
Apr.	20	Profit and loſſe is debitor, & ought to giue to Linnen cloth for ½ peece giuen away	5	8	12	00
	30	To Iohn Clauſon for intereſt	3	16	00	00
May	31	To P. Iohnſon loſt by a Bill of exch.	3	4	17	02
Iune	22	To Gouert Iohnſon loſt by exchange.	6	1	05	04
	30	To Nicholas de Reo giuen him	6	100	00	00
Iuly.	22	To money for ſeuerall charges	2	350	00	00
Dec	18	To Pepper for a Bale taken at ſea	11	140	00	00
	18	To Money loſt in payments	2	14	16	00
	18	To Rye loſt in ſale	4	59	05	00
	31	To account Currant carried to ballance	1	257	16	04

Summe—952—11—10

M.	D	(1621. No. 7.)	F.	L.	S.	D
Ian.	15	Harman Iohnſon is Creditor and ought to haue of money receaued in part of Rye per contra, Deb.	2	83	00	00
May	1	Of money receaued in full of a debt.	2	282	00	00
Aug	20	Of Hans Greene payed him by exchange, Deb.	10	460	00	00
		Summe—8:5—4—8				

M.	D	(1621. No. 7.)	F.	L.	S	D
Ian.	31	Profite and loſſe is Creditor and ought to haue of Nicholas de Reo for intereſt of money	6	218	00	
Mar	1	Of Iohn Cleane for exchange	9	3000	00	
May	1	Of Harman Iohnſon for intereſt	7	05	00	00
	31	Of Peter Iohnſon for exchange	3	22	17	02
Iune	31	Of Piſtolets gotten by exchange	2	1000	00	
	22	Of Hans Iohnſon by exchange	7	1004		8
Dec	31	Of Linnen cloth gotten in ſale	5	13:	02	0
	31	Of Lisborne Voyage gotten in ſale	9	635	0	00
	31	Of Saffron gotten in ſale	13	104	10	00
		Summe—953—11—10				

M.	D	(1621. No. 8.)	F.	L.	S.	D
Feb.	4	Iohn Seuenſlapper ought to giue to Money lent him to pay the laſt of this moneth	2	300	00	00
Mar	16	To Money paied him in full of a debt per contra	2	60	00	00
Apr.	9	To Lisborne Voyage for loſſe of Goods aſſured, &c.	9	300	00	00
		Summe—660—00—00				

M.	D	(1621. No. 8.)	F.	L.	S.	D
Sep.	30	Peter Bloome is debitor and ought to giue to Iſhes ſold him for the account of Hans Kemerling, &c.	12	496	00	00
		To Hans Kemerling for ballance of this account	14	54	00	00
		Summe—550—00—0				

M.	D	(1621. No. 8.)	F.	L.	S.	D
Mar	16	Iohn Seuenſlapper is Creditor and ought to haue of Weale for 8 Tuns at 45 li. the Tun, Deb.	4	360	00	00
Apr.	9	Of mony receaued in full of goods aſſured, per contra, Deb.	2	300	00	00

Summe – 660—00—00

M.	D	(1621. No. 8.)	F.	L.	S.	D
Feb.		Peter Bloome is Creditor & ought to haue of Rye for 10 Tunnes at 55 pounds the Tunne, to pay the 18 of this moneth	4	550	00	00

Summe—550—00—0

M.	D	(1621. No. 9.)	F.	L.	S.	D
Feb.	24	Voyage to Lisborne ought to giue to Rye for 20 Tuns stocke to Hans Cardinall, Cre.	4	1050	00	00
	24	To money payd to Iohn Seuenslapper for assurance, Cre.	2	75	00	00
	24	To mony for seuerall charges	2	100	00	00
Dec	31	To profite and losse gotten in sale Cre.	7	635	00	06
		Summe—1860—00—00				

M.	D	(1621. No. 9.)	F.	L.	S.	D
Ma.	1	Iohn Cleane ought to giue to mony paid him vpon aduenture to be paied in Danske to Hans Greene	2	210	00	00
	1	To profite and losse for the profite thereof, Cre.	7	30	00	00
		Summe—240—0—0				

M.	D	(1621. No. 9.)	F.	L.	S.	D
Apr.	15	Voyage to Lisborne ought to haue of Iohn Seuenſlapper for goods which he aſſured	8	300	00	00
		Of Hans Cardinall Factor, as by his letter appeareth	11	1560	00	00
		Summe—1860—00—0				

M.	D	(1621. No. 9.)	F.	L.	S.	D
May	8	Iohn Cleane ought to haue of Hans Greene which hee hath payed him in Danske, as by a Letter from the ſaid Hans appeareth, Deb.	10	240	00	00
		Summe—240—0—0				

M.	D	(1621. No. 10.)	F.	L.	S.	D
May	4	Allert Skatter ought to giue to Nicholas de Reo, receaued by assignement, Cre.———	6	350	18	00
	4	To money payed in full of Linnen cloth per contra, Cr———	2	149	02	00
Sep.	15	To Wheat for the account of Hans Kemerling, to pay 1500 pounds ready money, the reſt the laſt of October next———	11	1600	00	00

Summe—2100—00—0

M.	D	(1621. No. 10.)	F.	L.	S.	D
May	8	Hans Greene ought to giue to Iohn Cleane which hee receaued of him in Danske———	9	2400	00	00
Aug	20	To Harman Iohnſon receaued in Danske by exchange———	7	460	04	08
Dec	31	To account Currant carried to ballance, Cre.———	14	441	00	08

Summe—1141—5—4

M.	D	(1621. No. 10.)	F.	L.	S.	D
Mar	4	Allert Scatter ought to haue of Linnen cloth for 25 pieces at 20 pounds the piece, to pay part money, part by a debt aſſigned	5	500	00	00
Oct	5	Of Money receaued in part of Wheat per contra, Deb.	2	1500	00	00
	11	To Money receaued in full of Wheat per contra, Deb.	2	100	00	00
		Summe — 100 — 00 — 00				

M.	D	(1621. No. 10.)	F.	L.	S	D
May	15	Hans Greene ought to haue of Peter Iohnſon paid him in Danske, De.	3	240	00	00
Aug	14	Of Gouert Iohnſon payed him in Danske, Deb.	6	301	05	04
	20	Of Peter Iohnſon payed him in Danske, Deb.	2	600	00	00
		Summe — 141 — 5 — 4				

M.	D	(1621. No. 11.)	F.	L.	S.	D
July	8	Hans Cardinall ought to giue to Liſborne Voyage for ſo much he hath receaued for Rye, cleare of all charges, as by his letter appeareth —— ——	9	1560	00	00

Summe—1560—00—00

M.	D	(1621. No. 11.)	F.	L.	S.	D
Iune		Wheat ought to giue to Hans Kemerling for 20 Tuns receaued to his account at 60 pounds the Tunne, Cre. ——	12	1200	00	00
		To account Currant to ballance, Cre. ——	12	400	00	00

Summe—1600—00—00

M.	D	(1621. No. 11.)	F.	L.	S.	D
July	12	Hans Cardinall ought to haue of Saffron for 4 bales receaued of Iohn Pran	13	140	00	00
		Of profite and losse for 1 Bale of Pepper taken out of Iohn Prans ship at Sea	7	140	00	00
		Summe—1560—00—0				

M.	D	(1621. No. 11.)	F.	L.	S.	D
Sep.		Wheat ought to haue of Allert Scatter for 20 Tunnes at 80 pounds the Tun, for the account of Hans Kemerling	10	1600	00	00
		Summe—1600—00—0				

M.	D	(1621. No. 12.)	F.	L.	S.	D
Iun.	4	Hans Kemerling ought to giue to mo=ney paid for charges of wheat——	2	191	15	03
	4	To Mony for charges of Ashes, Cr.	2	37	18	00
Oct	15	To Saffron, Creditor —— ——	13	785	00	00
Dec	15	To mony for charges of Wheat——	2	24	06	10
	16	To mony for charges of Ashes——	2	2	15	00
	31	To account Currant carried to bal=lance, Cre.————————	14	1054	04	6

Summe—2096—0—0

M.	D	(1621. No. 12.)	F.	L.	S.	D
Iune	4	Ashes for the account of Hans Kemer=ling ought to giue for 7 Tuns 10 Barrels, as in Cr.————————	12	400	00	00
Dec	31	To account Currant carried to Bal=lance, Cre.————————	12	96	00	00

Summe—496—00—00

M.	D	(1621. No. 12.)	F.	L.	S.	D
Iune	4	Hans Kemerling ought to haue of Wheat for 20 Tunnes at 60 pounds the Tun, Deb.	11	1200	00	00
	4	Of Aſhes for 7 Tuns 10 Barels, which commeth to	12	400	08	00
Dec	31	Of wheat for profit thereof	11	400	00	00
	31	Of Aſhes for profit thereof	12	96	00	00

Summe—2096—0—0

M.	D	(1621. No. 12.)	F.	L.	S.	D
Sep	30	Aſhes for the account of Hans Kemerling ought to haue of Pe. Bloome, Debitor	8	496	00	00

Summe—496—00—00

M.	D	(1621. No. 13.)	F.	L.	S.	D
Iuly	12	Saffron ought to giue to Hans Cardinall for 324 pounds, as in Cre.	11	1420	00	00
	12	To mony for charges, Cre.	2	12	00	00
Dec	31	To profit and losse gotten in sale, Cre.	7	104	10	00

Summe — 1536 — 10 — 00

M.	D	(1621. No. 13.)	F.	L.	S.	D
Oct		Saffron ought to haue of Hans Kemerling for 157 pounds, as in Debitor	12	785	00	00
		Of account Currant carried to balance for 157 pounds remaining at 4 pounds 10 shil. the pound, Deb.	14	751	10	00
		Summe—1536—10—00				

Dec	31	Ballance of account is debitor and ought to giue by these parcels following, found by the shutting vp of diuers accounts which are Creditors in this Booke A, and are carried Debitors into the Booke B, for so much remaining in ready money, Cr.	2	3938	01	06
		To Meale for 30 Tuns, Cre. ——	4	1360	00	00
		To Linnen cloth for 11 peeces ½ rated at 20 pounds the peece, Cre. ——	5	230	00	00
		To Saffron for 167 pounds at 4 pounds 10 shil. the pound, Cre. ——	13	751	00	00
		Summe — 6279 — 01 — 06				

Dec		Ballance of account ought to haue by theſe Sums following, found by footes of accounts, which to ſhut vp they are made Debitors in this Booke A, & from hence carried Creditor into the Booke B, that is to ſay,				
		of Iohn Clauſon, Deb.	3	416	00	00
		Of Peter Bloome, Deb.	8	54	00	00
		Of Hans Greene, Deb.	10	441	00	00
		Of Hans Kemerling Deb.	12	1054	04	06
		There reſteth to bee carried vnto ſtocke, as in Debitor	1	4313	16	04
		Summe — 6279 — 01 — 06				

FINIS.

$\frac{120}{2}$
$\frac{60}{2}$
$\frac{30}{2}$
$\frac{15}{2}$ } p. 144.

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